

# The Commercial Car Journal

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## No Definite Agreement Between Unit and Truck Manufacturers

**Expect New Committees Appointed at Detroit Meeting to Evolve a Standard System or Plan for Overcoming Present Difficulties. Indications Point to Closer Co-operation Between These Groups**

By A. V. COMINGS

**T**HAT the distribution and sale of truck unit service parts shall be accomplished in a manner satisfactory to user, dealer, truck manufacturer and parts manufacturer, was the outstanding, big result of the meeting at Detroit, April 12, of over fifty officials of motor truck and truck unit manufacturing companies. The method of this distribution was not determined, but so thoroughly were both groups of manufacturers imbued with the idea that a way could be found, that there is little doubt but that announcement will be made after the next meeting that a standard system has been devised and will be put into execution in the near future.

### **Committees Appointed to Work Out Details**

At the conclusion of this meeting committees were appointed from both groups of manufacturers to work out the details of a plan. From the truck manufacturers the committee consists of Mark Pulcher, vice-president and general manager Federal Motor Truck Co.; E. A. Williams, president and general manager Garford Motor Truck Co.; Moie Cook, secretary and general manager Service Motor Truck Co.; A. J. Whipple, general sales manager Republic Motor Truck Co., and J. W. Stephenson, treasurer and general manager, Indiana Motor Truck Co. The unit makers committee consists of Messrs. George W. Yeoman, vice-president Continental Motors Corp.; Col. Fred Glover, general manager, Timken Detroit Axle Co.; H. L. Horning, general manager Waukesha Motor Co.; C. A. Dana, Spicer Mfg. Co., and L. M. Viles, president of the Buda Motor Co.

The meeting was held at the new Hotel Wolverine, with President B. A. Gramm, of the Motor Truck Manufacturers' Association in the chair. Announcement by the unit manufacturers some time previously that they planned the establishment of parts depots all over the country

for the sale of service parts for their various units, had brought heated reaction from the truck manufacturers, who did not believe their dealer organizations could survive if this business was taken from them. Preliminary conferences had brought no solution to the divergent views, and when the two groups gathered in the called meeting there was a tenseness to the atmosphere that presaged an interesting meeting, to say the least.

But never has a serious situation been more thoroughly blasted by a bit of humor. An hour's talk, pro and con, had brought the groups to no evident solution, when Harry Horning secured the floor. And instead of prolonging the discussion he told a story, a story so apropos to the occasion, and so pointed with the shaft of pertinent humor, that it struck straight home. Roars of laughter swept the meeting, the tension was relaxed, and when the subject was again taken up at the conclusion of his talk, there was no doubt in any one's mind that a solution would eventually be reached satisfactory, as a compromise, at least, to all interests.

### **Report Against Parts Service Depots**

Shortly after the meeting was called to order, Otto Armleder, president of the O. Armleder Co., read the report of the committee appointed by the Motor Truck Manufacturers' Association at its Detroit meeting of March 29, to consider the proposed action of the parts manufacturers in establishing independent parts service depots. This report put the committee on record as against the establishment of these depots "as detrimental to the best interests of the industry, looked at from the viewpoint not only of the truck assembler and the truck distributor, and truck owner, but also from the viewpoint of the parts manufacturers themselves." The committee further recommended that the truck manufacturers meet to formulate ways and means to correct present weakness in the industry that have

brought about this desire on the part of the parts makers to have their independent stations.

The principal talk in opposition to the parts makers' independent depots was made by M. A. Pulcher, of Federal. He pointed out that truck manufacturers are having serious times these days keeping their dealer organizations intact, and that to take from them the profit they must have in selling service parts and in servicing the trucks they sell, would put large numbers of them out of business, and demoralize the industry to such an extent that the unit makers themselves would seriously suffer from lack of business. He pointed out the necessity of the dealer keeping in frequent contact with users of his make of truck, so that he could render the service that meant repeat orders, a sales asset that rates high with the right kind of dealers.

### **Recommends Standardization of Parts Price Lists**

Mr. Pulcher further suggested that strong distributor and dealer organizations, carrying the proper supply of parts, can and do sell parts to other dealers and to truck users whose make of trucks is not serviced in their vicinity, and that this kind of service will not be bettered to any extent by independent depots. He cited the very wide range of prices on standard repair parts, and said that one of the biggest things the parts makers could do would be to standardize their price lists, and bring their prices down to a lower level, that all dealers could charge the same for similar parts, consumer getting his service parts at a minimum expense.

For the unit manufacturers, G. W. Yeoman, of Continental Motors, presented the case. Mr. Yeoman outlined the plan the Continental has had in vogue for five years, and which the parts makers want to extend to a much greater scope. He stated that the so-called "pirate" parts manufacturers have become a menacing

figure in the replacement of damaged parts in motors and other units, for where these parts are of inferior material and workmanship they have caused damage that reflects on the unit rather than on the part. These parts are now sold at low prices direct to consumers or to repair stations.

#### Independent Stations Would Help Truck Assemblers

Mr. Yeoman, though realizing the opposition of the truck assemblers to his plan, stated that it was his sincere belief that the establishment of the independent service stations would help the truck assemblers' business greatly through the release of much dealer and distributor capital now tied up in service parts, this capital to be used in furthering truck sales in which there was greater profit.

The morning session was brought to a close by a decision to appoint a committee from each group to meet independently during the noon hour and bring in concrete suggestions at the afternoon session for a settlement of the question acceptable to both sides. The committee appointed to confer at noon from the unit makers consisted of Messrs. Yeoman, Glover, Horning, Dana and Viles. From the truck manufacturers, Messrs. Pulcher, Zacharias, Whipple, Moie Cook, Armleder, Burch and S. A. Cook were named.

#### Ask for Closer Co-operation

At the afternoon session the report of the motor truck manufacturers committee was ably presented by David Thomas, general manager of the Truck Manufacturers' Association. The report set forth that the truck manufacturers are unanimously opposed to the parts manufacturers establishing their own service stations, as being detrimental to the best interests of unit and parts makers, the truck assembler and the dealer and user. The manufacturers accepted full responsibility for servicing their trucks and asked the co-operation of the parts makers in solving their problems. They feel that they, and their dealer organizations, have created the market for the parts and unit makers and are entitled to a legitimate profit in serving the trucks he has sold. They also stated that they felt all problems confronting the merchandising of the assembled product can be solved by closer co-operation between the two groups of manufacturers.

The report pointed out wherein the truck manufacturers feel the parts maker has fallen short of his obligations, in delayed delivery of parts wanted, in prices, in unwillingness to assume consequential damages, in not receiving returned parts, and in changing design without consulting truck manufacturers. The report also acknowledged wherein the truck manufac-

turer has fallen down, in not insisting on his dealer carrying proper service parts, and that the parts sold shall not be so-called "pirate" parts. The faults of the dealer were pointed out as failure to know the fundamentals of good merchandizing and his failure to make money through lack of standardized methods and policies.

As remedies the motor truck manufacturers' committee suggested closer co-operation with the unit and parts manufacturer, insistence on dealers carrying proper service parts, servicing the orphan truck from their stocks, educating the dealer to the importance of his service department and teaching him good merchandising methods, the creation of uniform price lists and prices to fit all classes of parts, traveling mechanics from the parts makers, and a willingness on the part of the unit maker to share the

losses occasioned the truck manufacturer through breaking down of units.

The report also recommended the appointment of the two committees named at the beginning of this article.

A thorough discussion of the report brought out several interesting points along lines already introduced into the deliberations, but throughout the discussion there ran the evident desire of both sides to meet on some common ground where the position of the assembled truck manufacturers could be strengthened for the good of all concerned.

The committees appointed at this meeting are working out the solution of the service problem, and a meeting will be held in the near future to come to a final understanding.

Those present at the meeting were the following:

#### Motor Truck Manufacturers

The O. Armleder Company	Cincinnati, Ohio	O. Armleder, President
Clydesdale Motor Truck Company	Clyde, Ohio	A. C. Burch, Vice-President
Commerce Motor Car Company	Detroit, Mich.	Milton Pilford, Service Mgr.
Day-Elder Motors Corporation	Newark, N. J.	F. G. Elder, V. P. and Treas.
Denby Motor Truck Company	Detroit, Mich.	A. S. Moore, Pres. and Gen. Mgr.
Denby Motor Truck Company	Detroit, Mich.	L. B. Miles, Service Mgr.
Diamond "T" Motor Car Company	Chicago, Ill.	S. A. Cook, Secretary
Federal Motor Truck Company	Detroit, Mich.	M. L. Pulcher, V. P. and Gen. Mgr.
Garford Motor Truck Company	Lima, Ohio	A. Zacharias, Asst. to Pres.
Lewis Hall Motors Corporation	Detroit, Mich.	W. K. Ackerman, Vice-President
Liberty Motor Car Company	Detroit, Mich.	J. E. Fields, Dir. of Sales
Master Trucks, Incorporated	Chicago, Ill.	R. H. Reid, Sec. and Treas.
Napoleon Motors Company	Traverse City, Mich.	C. D. Peet, General Manager
Paige Detroit Motor Car Company	Detroit, Mich.	F. W. Henning, Dir. of Service
Paige Detroit Motor Car Company	Detroit, Mich.	Wm. D. Galan, Service Manager
Republic Motor Truck Company	Alma, Mich.	Frank E. Smith, 1st V. P.
Republic Motor Truck Company	Alma, Mich.	A. J. Whipple, Gen. Sales Mgr.
Selden Truck Corporation	Rochester, N. Y.	Wm. C. Barry, Vice-President
Service Motor Truck Company	Wabash, Ind.	M. Cook, General Manager
Stewart Motors Corporation	Buffalo, N. Y.	T. R. Lippard, President
Stoughton Wagon Company	Stoughton, Wis.	O. S. Beroth, Asst. Gen. Mgr.
Transport Truck Company	Mt. Pleasant, Mich.	C. V. Marshall, Pur. Agt.
Lewis Hall Motors Corporation	Detroit, Mich.	E. L. Southwick, Secy.-Treas.
Sterling Motor Truck Company	Milwaukee, Wis.	Frank Luick, Secretary
United States Motor Truck Co.	Cincinnati, Ohio	R. C. Stewart, President
Westcott Motor Car Company	Springfield, Ohio	H. G. Ross, General Manager
Winther Motor Truck Company	Kenosha, Wis.	Homer Hilton, V. P. and Sales Mgr.

#### Unit and Part Manufacturers

Arvac Mfg. Company	Anderson, Ind.	W. S. Bingham, Western Sales Mgr.
Bock Bearing Company	Toledo, Ohio	C. G. Steinbicker, Treasurer
Borg & Beck Company	Chicago, Ill.	Wm. Mack, Sales Manager
The Buda Company	Harvey, Ill.	L. M. Viles, President
The Buda Company	Harvey, Ill.	Jno. P. Mahoney, Sales Manager
Columbia Axle Company	Cleveland, Ohio	B. D. DeWeese, Sales Manager
Continental Motor Corporation	Detroit, Mich.	G. W. Yeoman, Vice-President
Detroit Gear & Machine Company	Detroit, Mich.	A. W. Copeland, President
Disteel Wheel Corporation	Detroit, Mich.	Geo. H. Hunt, Sales Manager
Gorey Automotive Parts Company	New York City	J. C. Gorey, President
Hinkley Motors Corporation	Detroit, Mich.	C. C. Hinkley, President
Hinkley Motors Corporation	Detroit, Mich.	C. A. Neville, Sales Manager
Hinkley Motors Corporation	Detroit, Mich.	O. M. Brede, Service Manager
Merchant & Evans Company	Philadelphia, Pa.	A. P. Hamilton, Sales Manager
Midwest Engine Company	Indianapolis, Ind.	Lon R. Smith, V. P. and Sales Mgr.
Morse Chain Company (Detroit Branch)	Detroit, Mich.	J. A. Sibell, Service Manager
Motive Parts Corporation	New York City	A. Ryder Dyer
Sheldon Axle Company	Detroit, Mich.	L. E. Lyons, Dist. Representative
Spicer Manufacturing Company	New York City	C. A. Dana
Spicer Manufacturing Company	Detroit, Mich.	H. W. Tapley, Detroit, Rep.
Timken Detroit Axle Company	Detroit, Mich.	A. R. Demory, President
Timken Detroit Axle Company	Detroit, Mich.	Fred Glover, V. P. and Gen. Mgr.
Timken Detroit Axle Company	Detroit, Mich.	P. W. Hood, Sales Manager
Torbensoen Axle Company	Cleveland, Ohio	A. E. Dixon, Sales Manager
Waukesha Motor Company	Waukesha, Wis.	H. L. Horning, General Manager

#### Service Parts Companies

Automotive Service Association	New York City	R. C. Rognon, President
Buda Engine Service Company	Chicago, Ill.	H. J. Templin, Secy.-Manager
General Auto Parts Company	Kansas City, Mo.	Estel Scott, General Manager

#### Trade Associations

National Automobile Dealers' Association	St. Louis, Mo.	Harry G. Moock, Manager
National Association Motor Truck Sales Managers	Detroit, Mich.	D. F. Whittaker, Secretary

#### Trade Journal Representatives

Chilton Company	Chicago, Ill.	Geo. H. Duck, Western Manager
Chilton Company	Philadelphia, Pa.	A. V. Comings, Commercial Editor
Class Journal Company	Detroit, Mich.	R. H. Burlingame, News Editor

## What Does Service Mean to the Dealer?

*Is the average service station an asset or a liability; whose fault is it, the manufacturer's or the dealer's? How is the little dealer in the "sticks" going to meet the service policies outlined by the factory? How is he solving the parts situation?*

In the June issue of the Commercial Car Journal we are going to discuss these subjects and show how some dealers are doing things, and how they are overcoming such difficulties.



# WHAT HAPPENED IN PENNSYLVANIA

*When the Motor Truck Dealers and Owners of That State Tried to Kill a Bill Which Threatened to Increase Truck License Fees Ranging From 80 to 200 Per Cent.*

*DID THEY WIN?  
Here's the Story:*

**A**BOUT a week before the Pennsylvania Legislature adjourned, a few members of the Motor Truck Association of Philadelphia happened to discover a bill that a certain Senator of Bucks county had been carefully guarding and which bill to all intents and purposes had for its object to collect a bunch of money from the already overtaxed motor truck owners of that state.

Of course, this particular bill wasn't rubbed under the nose of each and every owner and dealer in Pennsylvania. Oh, no! It was only through the eternal vigilance of the legislative committee of the M. T. A. that this bill was caught in time. If passed as originally drafted it would have cost the truck owners of the Keystone state just about \$1,800,000 extra for license fees next year.

Fortunately this bill did not go through without a compromise. Some hard work on the part of certain members of the truck association and delegates from other cities saved the truck owners about \$800,000 in next year's fees. Had the motor truck interests been more fully united than they are at present, they would undoubtedly have had the whole thing their way. And right here it might be mentioned that the motor truck dealers in some of our states have not as yet realized the fact that some of our legislators have the well-known cathartic beat to a frazzle when it comes to activity. And in this case the dealers and owners were doing the sleeping.

## Lack of Organization

Although a victory was won, even at the eleventh hour, how much better would the victory have been, had the truck interests been **organized**?

That it is absolutely essential that the motor truck dealers and owners' associations of a state should be thoroughly organized so as to combat legislation which is inimical to their welfare is well illustrated in what occurred in this case.

The Pennsylvania Legislature decided that it needed additional revenues to pay for state roads and maintenance, it is presumed. In fact, when the delegation of dealers and owners requested information as to the purpose for which the money was to be used, no satisfactory answer was forthcoming. Apparently it was enough that the motor truck owners were to pay—they were signaled out as

the easy marks. The protesting truck owners sent representatives to Harrisburg to impress upon officials that the motor truck owners were discriminated against and that the tax should be distributed so that truck and passenger car owners alike would share in the extra taxes.

They received little, if any, satisfaction. The delegates were willing to have the truck owners share in the extra taxes, but not to assume the whole burden. What about the passenger car owners—why shouldn't they stand a certain percentage of the increase? Three words give the answer—

## They Were Organized

What happened was simply this: When the passenger car interests realized that they might be penalized they got busy and protected themselves by conducting an active campaign in behalf of the Woodruff bill, which bill contained the rider calling for the excessive increase in license fees for motor trucks. The passenger car owners advocated the passage of the bill without amendment and so active were they and so powerful in their political influence that the motor truck men were forced to accept an increase of from 80 to 100 per cent. Thousands of postal cards were sent to passenger car owners throughout the state urging them to influence their Senators and Representatives to vote for the passage of the Woodruff bill.

When the question of increasing motor license fees was first proposed, Senator Buckman, sponsor of the increased tax bill, proposed that passenger cars be increased in proportion with the increase of truck fees. But the proposal met with instant opposition from the Pennsylvania Motor Federation, which organization led the opposition in behalf of the passenger car owners. The administration, fearing the **political influence of the passenger car owners** as a result of the activities of the Motor Federation and the rest of the allied motor clubs of the state, agreed that there should be no increase in passenger car fees.

The first attempt made by the motor truck men to have the proposed taxes reduced seemed very hopeful. In fact they were given to understand that their suggestions would be accepted. But, shortly after the conference it was learned that the provisions of the Buckman bill had

been **tacked on to the Woodruff bill** with the figures unchanged. The latter bill is one pertaining to the placing of sign posts on the highway and had nothing to do with license fees.

## Prompt Action Did the Trick

It was following this act of legislative jugglery that the motor truck men got busy in real earnest. At the monthly meeting of the Motor Truck Club of Philadelphia, the matter was brought to the attention of the members and owners. Action was immediately taken to have all members of the truck organization and truck owners belonging to the Motor Truck Owners' Association, the Pennsylvania Furniture Warehousemen's Association, the Philadelphia Milk Exchange and kindred organizations send telegrams and representatives to Harrisburg to protest against the excessive fees. In addition to this, advertising and publicity campaigns were conducted in the daily press throughout the state.

This propaganda was indeed effective, as the direct result was a compromise bill under which the average increase will be about 100 per cent.

Furthermore the motor truck men secured a reclassification of chassis weights which will prove advantageous to owners of medium sized trucks and it gives them a lower license fee than they would have been obliged to pay under the old classification per the increased license fee rates.

The rates as finally agreed upon are:

	Pres't Solid Pneu. Rate. Tires. Tires		
Class AA—2000 to 3000 lbs.	\$20	\$30	\$24
Class A —3000 to 4000 lbs.	25	40	32
Class B —4000 to 5000 lbs.	30	50	40
Class C —5000 to 6000 lbs.	30	70	56
Class D —6000 to 7500 lbs.	50	100	80
Class E —7500 to 8500 lbs.	75	125	100
Class F —More than 8500 lbs.	150	200	140

It was also agreed that electric commercial trucks, equipped with solid tires, would be allowed the same rate as pneumatic-tired, gas-propelled trucks. The changes in classifications were in Class D, which was made from 6000 to 7500; Class E from 7500 to 8500, and Class F from 8500 upward, there being added 500 pounds to the maximum in each class.

Throughout the entire sessions with the State Highway department officials the motor truck delegation expressed

their desire to play fair with the State Administration if the latter would play fair with them. The results, however, plainly indicated to the dealers and truck owners that political influences play the major role in such fights. The passenger car owners' influence was given consideration—because there are more than 450,000 passenger car owners registered in Pennsylvania, while there are about 48,000 truck owners.

The visiting delegation claimed that it was an injustice to the industry and to the 48,000 owners to place the whole burden of taxation on them. The Highway Department representatives claimed that

motor trucks obliged the state to spend \$15,000 more for road construction than would be required if the trucks did not use the roads, which was combated by the argument that only a small percentage of the trucks used the state roads, the major proportion being confined to the city, borough and town roads, which were not supported by the state.

Which all goes to show that the matter of increasing license fees lies in the hands of a few individuals who sometimes are misinformed and who, perhaps, unwillingly, single out one industry in discrimination above another. In this particular instance the motor truck industry was IT.

The Highway Department even went so far as to agree that in the future any suggested increases should be worked out on a scientific basis from data covering the operation of trucks and their known wear and tear on the roads, as the proposed increases were of a somewhat problematical character.

Legislation of a similar character is continuously cropping up in various states and it can only be successfully fought by the united effort of all concerned. That's the reason why motor truck dealers should be regular fellows in their organizations. The foregoing shows what happened in Pennsylvania—how about your state?

### Texas Truck Owners Must Suffer Under a Heavy Motor Vehicle Tax

Not only the automotive industry of Texas, but the entire commercial interests of the Lone Star state as well have risen in protest against a measure passed quietly at the last session of the Legislature which places a new and double burden of taxation upon the motor truck operators of the Southwestern commonwealth. Besides practically doubling the tax on heavy-duty motor trucks, this new law adds a heavy mileage tax.

The motor truck bill, known as Senate Bill No. 101, was kept under cover by its author, a member well versed in legislative procedure, and by being presented as an emergency measure, escaped the legislative routine that would have permitted full publicity.

The law is framed as an amendment to the state highway registration act. The only changes in its provisions are those relating to motor trucks.

The act defines a commercial motor vehicle as a "motor vehicles with a net carrying capacity of more than one ton, intended, designed or used for the transportation of property.

The license fee is as follows:

2,001 to 4,000 lb. ....	\$30.00
4,001 to 5,000 lb. ....	50.00
6,001 to 8,000 lb. ....	80.00
8,001 to 10,000 lb. ....	120.00

For each trailer or semi-trailer the fees are based on the tire equipment:

Pneumatic tires .....	15 cents per 100 lb.
Solid tires .....	25 cents
Iron, steel, etc. ....	35 cents

After paying this tax and securing a license, the motor truck operator must then make application for another license, stating the general routes of each truck and the mileage in each county, on roads outside incorporated towns. After complying with this, he is given another license, and required to pay an additional tax in proportion to mileage traveled per quarterly.

It is interesting to note that many of the legislators who voted for this bill confessed that they had no realization of the effects of its provisions and believed that they were voting for a bill to aid good roads. Governor Neff did not sign the bill, but under the Texas law, simply by lapse of time, became a statute without his signature.

Among the measures defeated at the last session was one imposing a tax of one

cent per gallon on gasoline; a bill preventing any wholesaler from giving exclusive representation to any retail dealer; and another which would have given any person injured or receiving property damage by a motor vehicle a lien on the vehicle which would have precedence over all other liens, including that of the dealer who sold it.

Governor Neff has announced his intention of calling an extra session of the Legislature to meet about June 1. It is certain that the business interests of Texas will be present at this session.

### Wood Wheel Service Organization a Real All-around Benefit

Very satisfactory results are being obtained from the service station plan inaugurated by the Automotive Wood Wheel Manufacturers' Association. This success is attributed to an inflexible standard of requirements and strict adherence to a well defined scheme.

First of all, the Association determined from the repair work done in their own plants, just what facilities a station would require to handle all classes of servicing from minor overhauling to major repair work. Once decided upon, these facilities

became a basis for reckoning the eligibility of a candidate repair shop.

After these equipment requirements were settled and agreed upon, the wood wheel repair shops of the country were circularized by means of questionnaires. From the replies, ineligible were winnowed out and then the remaining prospects in each territory were carefully investigated as to the character of their workmanship, their responsibility and local standing. The volume of business in each locality was taken into account, and a sufficient number of the qualifying repair shops were selected to care for it.

By no means did these appointments constitute a closed-door proposition. Tenure of the official appointment was made to depend entirely upon the maintenance of the quality standards established by the Association. Furthermore, provisions were made to grant additional appointments to repair shops that qualify in the future.

This was just a beginning. At the same time that the official stations were appointed, a number of constructive measures were undertaken simultaneously. Among the more important was the adoption of a standard out-door sign with which the public was immediately familiarized through the Association's advertising. A twice-a-month bulletin was inaugurated to act as a clearing house for repair methods and suggestions from the individual stations. Common sources of wheel materials were made available. Furthermore, contact between the manufacturers and service stations was efficiently centralized in one office located in Chicago.

This "get together" movement of the wood wheel people has produced a very practical, close-knit organization. In its plan and its activities there is, happily, a new expression of the axiom that was so thoroughly demonstrated during the war; namely, an ounce of enthusiastic co-operation is worth a ton of bitter competition.



New Service Station Sign Adopted by A. W. W. M. A.

**Know Service, the Life and Soul of Business. Let the June Issue Teach You.**



# Are You Selling Trucks to Farmers in These States?

## Here's an Analysis of 753 Reports From Farmer Truck Owners, Which Contains Invaluable Data for Truck Dealers



This Information, Which is Taken From Bulletin No. 910, Issued by the U. S. Agricultural Department, is Here Presented in Extracted Form. This Analysis Was Compiled by H. R. Tolley, Scientific Assistant, and L. M. Church, Assistant in Farm Accounting. For the Benefit of the Busy Dealer the Principal Facts Have Been Culled From This Bulletin, Complete Copies, However, Can be Secured From the Government Printing Office at Ten Cents Per Copy

**T**HIS data is based on the experience with motor trucks of 753 farmers in the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware and Maryland who have motor trucks for use on their own farms.

These farms are of all sizes and types, and the motor trucks used on them are of all sizes from  $\frac{1}{2}$  ton to 5 tons. The rated capacity of very few of the trucks is over 2 tons, however, and nearly half are of the 1 ton size.

Only 18 per cent of these farms are less than 5 miles from market, and nearly one-fourth are 20 miles or more from market.

Ninety-five per cent of these men believe that their trucks will prove to be profitable investments.

One-ton trucks are preferred by most of them. About half of the owners of  $\frac{1}{2}$  and  $\frac{3}{4}$  ton trucks prefer sizes larger than they now own.

In the opinions of these men the principal advantage of a motor truck is in saving time, and the principal disadvantage is "poor roads."

As compared with horses and wagons, the trucks save from half to two-thirds of the time required for hauling materials to and from the farms.

These men have return loads for their trucks on about one-fourth of the trips.

A majority still use their horses for road hauling.

On most of the farms all the hauling in the fields and around the buildings is done with horses and wagons.

About one-fourth of these men do some custom hauling with their trucks. The average amount received per year by those who do such work is \$174.

On the average there are about eight weeks during the year when the roads are in such condition on account of mud, snow, etc., that the trucks can not be used. Three-fourths of them usually travel on roads that are all or part dirt.

About one-fourth of the men have changed their markets, for at least a part of their produce, since purchasing trucks. For those who have changed market, the

average distance to the old market is 7 miles, and the average distance to the new market is 20 miles.

According to owners' estimates, each of these trucks travels an average of 3,820 miles per year and is used on 173 days per year.

The average estimated life of the trucks is between  $6\frac{1}{2}$  to 7 years, and, in most cases, depreciation is the largest single item of expense.

Most of the owners of the  $\frac{1}{2}$  ton and  $\frac{3}{4}$  ton trucks prefer pneumatic tires, the owners of the 1 ton trucks are about evenly divided in their preference, but most of the owners of trucks larger than 1 ton prefer solid tires.

Over two-thirds of these trucks had not been out of commission, when needed, for a single day during the year covered by the reports, and nearly the same proportion of the owners stated that they had not lost any appreciable time on account of motor and tire trouble, breakage, etc., when using their trucks. However, about one truck in thirty had been out of commission 10 days or more.

The average cost of operation of the  $\frac{1}{2}$  ton trucks was about 8 cents per mile; of the  $\frac{3}{4}$  ton trucks about 13 cents; of the 1 ton about 12 cents; of the  $1\frac{1}{4}$  ton and  $1\frac{1}{2}$  ton about 19 cents, and of the 2 ton about 20 cents.

The average cost of hauling crops, including the value of the driver's time at 50 cents an hour, was about 50 cents per ton-mile with the  $\frac{1}{2}$  ton trucks, 34 cents with the  $\frac{3}{4}$  ton, 26 cents with the 1 ton, 24 cents with the  $1\frac{1}{4}$  ton and  $1\frac{1}{2}$  ton, and 18 cents with the 2 ton trucks.

About four-fifths of these men state that their trucks save hired help. On the average they estimate that this saving amounts to \$324 per year.

About half the men have decreased the number of work stock by at least one head since purchasing their trucks. Less than one man in ten had disposed of more than two head, however.

Over half of the men whose farms contain more than 120 crop-acres own tractors. The number of work stock kept on the farms where both trucks and tractors are

owned is only slightly less than the number kept on the farms of corresponding size where only trucks are owned.

### Method of Study

In December, 1919, the crop reporters of the Bureau of Crop Estimates were asked to report the names and addresses of farmers who owned motor trucks for farm use. In all 9659 names and addresses of farmers in the 11 states were received. In all, 2,314, about 24 per cent of the farmers queried, replied to the questionnaire.

No reports from men owning second-hand trucks nor trucks made by the addition of truck units or attachments to passenger cars, were included in the study. Twenty-seven per cent of the reports were on machines of these classes. About 10 per cent of the reports were from men who had owned their trucks only six months or less, and they were also excluded. Another 30 per cent of the reports were excluded for other reasons. Some were from farmers who are using their trucks primarily for custom work, or in connection with other business, and only incidentally for farm work; some were from men who had sold their trucks; and a few of the reports were not filled out in sufficient detail to make their use worth while. The questionnaire called for information on over 150 items.

### Location of Farms and Types of Farming

The number of reports tabulated from each state follows:

Maine .....	11	Connecticut .....	17
New Hampshire .....	11	New York .....	241
Vermont .....	16	New Jersey .....	92
Massachusetts .....	63	Pennsylvania .....	235
Rhode Island .....	16	Delaware .....	11
Maryland .....	40		

These farms are of all sizes and types, varying from truck farms of only a few acres to large crop farms containing several hundred acres. The types of farming practiced have been classified into five groups, as follows:

- (1) Truck farms, on which the raising of vegetables and similar produce predominates.
- (2) Dairy farms, on which dairying is the principal enterprise.
- (3) Fruit farms.

(4) Crop farms, on which general field crops are raised, but few or no dairy cows are kept, and no live stock is raised for sale.

(5) General farms, where no one special enterprise predominates.

In the region studied there are many more general farms than any other type. Although more reports were received from men who operate general farms than from any other class, this does not necessarily mean that the percentage of such farmers who own motor trucks is larger than that of men who follow special types of farming.

The number of farms of the different types and their average size are shown in Table I.

Type of Farm	Number	Average Size
		Acres
Truck.....	149	64
Dairy.....	129	234
Fruit.....	113	111
Crop.....	48	237
General.....	314	210
All.....	753	173

Table I. Number of Farms of Different Types, and their Acreages

#### Distance to Market

Probably the most striking point concerning these farms is their great distance from market as compared with other farms in the same section. Only 18 per cent of these farms are less than 5 miles from market, while nearly one-fourth of them are 20 miles or more. As will appear later, some of the men who have very long hauls have changed their markets since purchasing their trucks, but the average distance from market, even before the purchase of the trucks, was a little over 10 miles.

Seven hundred and four men reported the distance to the towns where the materials hauled by trucks are usually marketed. The exact number of farms of different types at different distances from market is as follows:

Of 143 truck farms—  
 11 less than 5 mi. 32 from 5 to 9 mi.  
 34 from 10 to 14 mi.  
 33 from 15 to 19 mi. 9 from 25 to 29 mi.  
 17 from 20 to 24 mi. 7 30 mi. and over

Of 117 dairy farms—  
 48 less than 5 mi. 2 from 15 to 19 mi.  
 45 from 5 to 9 mi. 7 from 20 to 24 mi.  
 8 from 10 to 14 mi. 4 from 25 to 29 mi.  
 3 30 miles and over from market

Of 98 fruit farms—  
 18 less than 5 mi. 10 from 15 to 19 mi.  
 21 from 5 to 9 mi. 9 from 20 to 24 mi.  
 16 from 10 to 14 mi. 9 from 25 to 29 mi.  
 15 30 miles and over from market

Of 44 crop farms—  
 11 less than 5 mi. 4 from 15 to 19 mi.  
 15 from 5 to 9 mi. 4 from 20 to 24 mi.  
 4 from 10 to 14 mi. 1 from 25 to 29 mi.  
 5 30 miles and over from market

Of 302 general farms—  
 36 less than 5 mi. 57 from 15 to 19 mi.  
 67 from 5 to 9 mi. 22 from 20 to 24 mi.  
 68 from 10 to 14 mi. 23 from 25 to 29 mi.  
 29 30 miles and over from market

Of all the 704 farms—  
 18 per cent are less than 5 miles from market  
 25 per cent are from 5 to 9 miles from market  
 19 per cent are from 10 to 14 miles from market  
 15 per cent are from 15 to 19 miles from market  
 8 per cent are from 20 to 24 miles from market  
 7 per cent are from 25 to 29 miles from market  
 8 per cent are 30 miles and over from market

The distances from market of more than 4,000 farmers in these states, as shown by

farm survey records in the Office of Farm Management and Farm Economics, indicate that only a small percentage of all the farms in this section are more than 10 miles from market. The average distance from market of 4,271 farms is 4.1 miles, and the number at different distances is as follows:

2,936, or 68.7 %, less than 5 mi. from market  
 1,018, or 23.8 %, from 5 to 9 mi. from market  
 241, or 5.7 %, from 10 to 14 mi. from market  
 51, or 1.2 %, from 15 to 19 mi. from market  
 25, or 0.6 %, 20 mi. and over from market

#### Size of Truck

The motor trucks owned on these 753 farms are of many sizes, their rated capacities running from  $\frac{1}{2}$  ton to 5 tons. However, these men use more 1 ton trucks than any other size, and only a little more than 2 per cent of the total number are rated at more than 2 tons. The number of the different sizes on the farms of different types is as follows:

Truck Capacity	149 Truck Farms	129 Dairy Farms	113 Fruit Farms	48 Crop Farms	314 General Farms
$\frac{1}{2}$	24	43	17	1	65
$\frac{3}{4}$	18	14	17	5	41
1	59	62	48	19	156
$1\frac{1}{4}$ & $1\frac{1}{2}$	19	4	11	11	22
2	22	4	18	11	24
Over 2	7	2	2	1	6

#### Age of Trucks

The length of time the 753 trucks had been in use at the time the reports were made is as follows:

201 had been in use 7 to 12 months  
 269 had been in use 13 to 24 months  
 164 had been in use 25 to 36 months  
 119 had been in use 37 months or over

#### The Best Size

The fact that most of these men consider their motor trucks profitable investments does not mean, however, that they are all entirely satisfied with the particular machines which they own. It is very important that the truck should be of the proper size for the hauling which it is to do. Ordinarily both the first cost and the cost of operation of a small truck will be less than of a large one, but often the small truck will not carry as large loads as is desired, and more trips to haul a given amount of material will, therefore, be necessary than with a larger truck. A truck which is too large, however, would have to be operated with only a partial load a great part of the time, and the extra cost would more than offset the advantage of being able to carry larger loads on exceptional occasions.

There has evidently been a tendency on the part of some of these men to purchase trucks which experience has shown to be too small for their needs. While 444, or 64 per cent, prefer the size they now own, only 13 of the entire number prefer smaller sizes and 239 prefer larger sizes. However, the 1 ton size is preferred by nearly three times as many men as any other size, and only about 1 man in 25 prefers a truck of over 2 tons capacity.

#### Advantages and Disadvantages

There are advantages in the ownership of a motor truck, but just how great these advantages are and which should be given the greatest weight are questions unanswerable by the man who has not had

experience with a truck. A summary of the answers of 638 of these truck owners to the question "What is the principal advantage of a truck for farm use?" is given in Table II.

Principal Advantage	Number Reporting	Per cent of Total
Time saved.....	577	91
Saves horses.....	19	3
Better market.....	15	2
Convenience.....	13	2
Reduces Expense.....	9	1
Other.....	5	1
Total.....	638	

Table II. The "Principal Advantage" of a Motor Truck as Reported by Six Hundred and Thirty-eight Farmers.

More than 90 per cent of the owners believe that time saving is the principal advantage. There are other advantages, of course, but in the minds of these farmers this is the principal one. While only 15 of the men report that the principal advantage of the truck is that it enables them to go to a better market, a much larger number are going to a better market now than before the purchase of their trucks. Going to a market which is farther from their farms is simply a matter of taking more time for marketing, and part of the when who say that saving of time is the principal advantage find that the truck saves them sufficient time to enable them to go to the better market.

Disadvantages of the motor truck were reported by 283 men. (See Table III.) Of the remaining 470 farmers 297 did not answer the question and 173 stated that they knew of no disadvantages in owning a truck.

Principal Disadvantage	Number Reporting	Per cent of Total
Poor roads.....	168	59
Cost of operation.....	48	17
Soft ground.....	25	9
First cost.....	15	5
Incompetent driver.....	14	5
Mechanical trouble.....	8	3
Other.....	5	2
Total.....	283	

Table III. The "Principal Disadvantage" of a Motor Truck as Reported by Two Hundred and Thirty-eight Farmers

It is seen that "poor roads" was given as the principal disadvantage by 59 per cent of those who reported on this item. A large percentage of the reports stated that there is some time during the year when the roads are in such a condition that motor trucks can not be used. The men who live on unimproved roads, of course, have the greatest handicap in this respect, but even the best of roads may be impassable for a truck because of snow at certain times of the year in the region in which this study was made.

#### Road Hauling With Trucks

All materials hauled to and from the farms were divided into five general classes, viz, "Crops," "Milk," "Feed,"



"Fertilizer" (including lime and manure), and "Other." An idea of the relative amounts of these different classes of material hauled by the trucks may be obtained from the fact that 444 farms reported hauling a total of 52,977 tons of crops during the year; 100 reported hauling a total of 10,371 tons of milk; 96 reported hauling a total of 2,847 tons of feed; 118 reported hauling 6,487 tons of fertilizer; and 159 farmers reported hauling 14,599 tons of other material. The character of the crops to be hauled depends, of course, upon the type of farming practiced. All the crops raised on the different types of farms represented in this study are included.

Each farmer reported the size of load, length of haul, and the time required for the round trip with the truck. Similar information was given for hauling with wagons before the purchase of trucks. The time required for the round trip included the time required for loading and unloading the truck or wagon.

Table IV shows a comparison of the size of load, length of haul, and time required for hauling crops with trucks of different sizes and with wagons.

Size of Truck	With Truck				With Wagon			
	Size of Load	Distance Round	Hours per Ton Trip	Hours per Load Mile	Size of Load	Distance	Hours per Round Trip	Hours per Ton-Mile
	Pounds	Miles			Pounds	Miles		
1/4-Ton.....	960	10.4	2.5	0.50	1,505	9.0	7.2	1.06
1/2-Ton.....	1,851	12.9	3.2	.27	2,213	11.4	8.6	.68
1-Ton.....	2,391	13.0	3.4	.22	2,582	10.4	8.3	.62
1 1/2 to 2-Ton.....	3,469	10.1	2.8	.16	3,306	9.2	7.3	.49
2-Ton.....	4,928	16.6	3.6	.10	4,488	12.9	9.5	.34
Over 2-Ton.....	8,125	21.1	6.0	.07	5,783	19.7	13.8	.24

Table IV. Time Required to Haul Crops With Trucks, and With Wagons Before Purchase of Trucks (Five Hundred and Sixty-seven Reports)

Table V gives a like comparison for hauling milk, Table VI for hauling feed, and Table VII for hauling fertilizer.

For milk than for the other three materials. For each size of truck the average distance crops are hauled is slightly greater

Size of Truck	With Truck				With Wagon			
	Size of Load	Distance	Hours per Round Trip	Hours per Ton Mile	Size of Load	Distance	Hours per Round Trip	Hours per Ton Mile
	Pounds	Miles			Pounds	Miles		
1/4-Ton.....	609	4.3	1.4	1.10	657	4.1	3.1	2.30
1/2-Ton.....	1,264	7.9	2.6	.52	1,332	8.4	5.0	.90
1-Ton.....	1,301	5.1	1.6	.48	1,309	4.9	3.6	1.12

Table V. Time Required to Haul Milk With Trucks, and With Wagons Before Purchase of Trucks (One Hundred and Thirty-two Reports)

Size of Truck	With Truck				With Wagon			
	Size of Load	Distance	Hours per Round Trip	Hours per Ton Mile	Size of Load	Distance	Hours per Round Trip	Hours per Ton Mile
	Pounds	Miles			Pounds	Miles		
1/4-Ton.....	942	4.6	1.2	0.55	1,953	4.8	3.9	0.84
1/2-Ton.....	1,555	6.6	1.8	.35	2,331	7.4	6.7	.75
1-Ton.....	2,407	6.8	1.9	.23	2,824	5.7	4.8	.60
1 1/2 to 2-Ton.....	3,214	5.6	1.8	.20	3,071	5.6	5.0	.39
2-Ton.....	4,300	8.0	2.5	.14	3,300	7.8	7.0	.56

Table VI. Time Required to Haul Feed With Trucks, and With Wagons Before Purchase of Trucks (One Hundred and Thirteen Reports)

Size of Truck	With Truck				With Wagon			
	Size of Load	Distance	Hours per Round Trip	Hours per Ton Mile	Size of Load	Distance	Hours per Round Trip	Hours per Ton Mile
	Pounds	Miles			Pounds	Miles		
1/4-Ton.....	1,917	7.5	2.0	0.28	2,444	8.9	6.9	0.65
1-Ton.....	2,444	7.3	2.3	.27	2,962	6.8	5.7	.56
1 1/2 to 2-Ton.....	3,840	6.2	1.8	.15	3,681	6.1	4.5	.41
2-Ton.....	5,281	7.2	2.2	.12	4,107	5.5	5.3	.47

Table VII. Time Required to Haul Fertilizer With Trucks, and With Wagons Before Purchase of Trucks (One Hundred and Twenty-one Reports)

It will be seen that the men who are using the smaller trucks hauled comparatively small loads with their wagons; however, the average size of loads of crops hauled with the 1/2, 3/4 and 1 ton trucks is less than the average size of loads which were formerly hauled with wagons. The same is true with feed and fertilizer.

Milk was hauled almost entirely with 1 ton trucks or smaller, only 7 of 139 men who reported hauling milk having trucks larger than 1 ton. The size of load is smaller and the distance hauled is shorter

than the distance hauled with the wagons before the trucks were purchased, this difference being due to the fact that a number of men changed their markets after buying their trucks.

The hours per ton-mile were arrived at by dividing the hours for the round trip by the product of the distance in miles and size of load in tons. For instance, in Table IV the 1/2 ton truck carrying a load of 960 pounds a distance of 10.4 miles accomplishes 4.99 ton-miles of hauling. Since 2 1/2 hours are required for making this trip the time required per ton-mile is 0.50 hour. A comparison of the hours required per ton-mile for hauling by truck with the hours per ton-mile required for hauling by horses and wagons gives the proportion of the time saved by using the truck.

In nearly every case the percentage of time which the trucks of different sizes are saving their owners in hauling different materials, is more than half of the time formerly required to haul with wagons.

Return Loads

The percentage of time which a truck is run without a load has a direct influence on the cost per unit of hauling with the truck. If a farmer can arrange to haul a load of produce to market and bring back a load of supplies to the farm on the same trip, he will reduce the time required and expense for hauling practically 50 per cent. The reports of these men show that they have loads both ways for their trucks on an average of about 26 per cent of their trips. Thirty per cent of the men, however, stated that they never have return loads. The dairy farmers and general farmers reported return loads a considerably larger percentage of the time than did the fruit, truck, and crop farmers.

Road Hauling for Which Trucks Are Not Used

A majority of these men still use their horses to supplement their trucks in hauling on the road. While 516 men reported concerning their present use of horses for road hauling, only 193, or 37 per cent, stated that they did all their road hauling during the year preceding the time of reporting with trucks.

It was not possible to determine from the reports the exact proportion of the road hauling which is still done with horses on these farms. However, on a large majority of them horses were used only for road hauling which it was necessary to do at times when the trucks could

# This Banker Believes in Motor Trucks; He Sells 'Em

**J. F. Mackey, Centralia, Ill., President of Five Banks and of Companies Distributing the United States Motor Truck, Believes in Motor Transportation and Backs His Belief With Money and Brains**

By A. V. COMINGS

**I**T is conceded today that to be a successful merchandiser of motor trucks a man must be a good business man. It is also conceded that he must have fairly cordial relations with his banker. Therefore, if the manufacturer can secure as his distributor, in a wide territory, a banker who is a thorough business man, that manufacturer is fortunate indeed.

This is the combination the United States Motor Truck Co. has secured in one of its chief distributing territories, and that the combination is a happy one is proved daily in actual business done.

The banker-dealer is J. F. Mackey, president of the Centralia Trust and Savings Bank of Centralia, Ill. Not only is Mr. Mackey president of this bank, he is also president of several other banks in south central Illinois, is an officer of a new national bank now forming in St. Louis and is president of the Marion County Motor Co., of Centralia, the U. S. Truck Sales Co., of St. Louis, and the U. S. Truck Sales Co., of Kansas City. The latter three companies distribute United States motor trucks through south central Illinois, all of Missouri and eastern Kansas.

Go back to the beginning of this bank-



**Marion County Motor Company, Centralia, Ill., Mackey's First Truck-Handling Concern**

er's interest in motor transportation and see if it wouldn't be a good idea right now for manufacturers to spend a little more time in selling the motor transportation future to the country banker at large.

Mr. Mackey, in addition to his banks, owns several farms in southern Illinois. During the war he was deeply interested in the labor problem of the farmer through his own interests along this direction, and it was then that he saw the gradual trend toward power farming through the necessity forced on the farmer through lack of help. This meant tractors and motor trucks, and as he already owned the Marion County Motor Co. as a passenger car distributing company, he decided that the time was ripe for him to branch out into the motor truck field. He saw a motor truck on every farm of the future, and he decided to be the big distributor for his rich farming territory. He took on a line of trucks and because he sold them as any other good business man would, he made money.

In 1920 when the United States Motor Truck Co. exhibited in the lobby of the Sherman Hotel in Chicago during the passenger car show, Mr. Mackey called at the exhibit. Realizing the advantage of a distributor of this type, Forrest J. Alvin, general manager of the U. S. Company, interested Mr. Mackey in the line and before he left Chicago the banker had decided to handle the trucks in southern Illinois.

Realizing that he would need a thoroughly up to the minute motor truck man to handle the business he secured J. A. Pope, at that time a district sales manager for the U. S. Company, and today Mr. Pope, from the Centralia office, man-

ages the distribution of the trucks through the various other companies.

Fine big salesrooms have been taken in St. Louis and Kansas City, efficient management has been installed in each place, big stocks of parts have been put on the shelves and the company is going after business in these states as it never has before.

Because the company can show its prospective dealers that it is sound as to the future and that the manufacturer it represents is also financially sound and that it will be in business in years to come, sub dealers have

been fairly easy to secure.

Mr. Pope has instituted a policy of education of the sub dealer that cannot fail to make him a better business man, for Mr. Mackey, being a business man himself, will not tolerate dealers who try to get by with the same old methods that have spelled failure to so many in the retail selling field.

The success of this banker who knows that the future of motor transportation is assured, and that it is especially adapted to the rural sections, stands out like a beacon in these days when bankers do not seem to appreciate what motor trucks may do for the country's prosperity if



**J. F. Mackey**

President of five banks and head of the Mackey truck companies



**J. A. Pope**

General manager of the Mackey truck companies



properly handled. It surely points the way to a better and more concerted effort on the part of the industry in showing bankers generally what can be done where the business is properly financed

and where the correct business methods are used.

Mr. Mackey has not stopped in his progress. He plans to handle tractors just as soon as the time becomes ripe,

making his business houses general automotive centers for the communities in which they are located.

Would that there were more bankers of Mr. Mackey's vision and ability.

# Truck Sales Managers' Association Maps Out Definite Program for the Year

Joins Hands With N. A. D. A. to Fight Drastic Legislation. Truck Dealers Are Asked to Join the National Dealers' Association

Are You Truck Dealers Going to Do Your Part?

By A. V. COMINGS

**A** DEFINITE and comprehensive program of a thoroughly constructive nature has been adopted by the National Association of Motor Truck Sales Managers, and during the remainder of this year this program will be followed through in an aggressive manner. It covers a wide range of subjects looking to the betterment of the industry from many standpoints and much good should result from this well-directed effort. The program was prepared under the direction of Homer Hilton at the time he was managing director of the association, and to Don F. Whittaker, the new executive secretary, has been delegated much of the task of putting the program through. An outline of the work planned follows:

**Association affiliations.** Closer co-operation with other associations in the business for mutual betterment with the object of creating a closer affiliation between all divisions of the motor truck industry by taking a leading part.

**Dealer co-operation.** The association will use its influence in having all trade associations maintain truck dealer divisions for the betterment of dealer conditions. Members of the sales managers' association will endeavor to attend meetings of these truck dealers divisions and give talks on various subjects of value to the dealers, especially along lines of better business methods. An endeavor will be made to have dealers' salesmen, bankers and others interested, attend these meetings. A better understanding between dealers and the sales managers of their various companies will also be promoted by this means.

In this connection a recent conference was held between Mr. Whittaker and Harry G. Moock, manager of the National Automobile Dealers' Association, to formulate plans for closer co-operation between the truck dealers and the national organization.

Since its organization the N. A. D. A. has fought the truck dealers' battles in a national way, saving the dealers hundreds of thousands of dollars in taxes, anti-truck legislation, etc. Only a small percentage of the national membership is

made up of truck dealers, and to carry on this work it is vitally necessary that more truck dealers come into the national association and support it with their dues and their influence.

Realizing the necessity of a greater truck dealer membership, many of the sales managers of the truck manufacturing companies are making a personal effort to get their retail dealers to join the national association and a large increase in truck membership will doubtless result.

An aggressive campaign is already under way on the part of the motor truck sales managers' association to familiarize the truck dealers and their sales organizations not only with the need for concerted action in the industry in vigorously opposing the harmful and vicious legislation which is so frequently proposed in all parts of the United States, but on constructive work of a highly important nature essential to its proper growth.

The co-operation of the two national associations should work out in a large way to the betterment of conditions generally.

**Educational activities.** A wide educational program is planned, which will include participation in truck tours, exhibits, fairs, work of the highway transport committee, co-operation with highway engineering activities of the universities, issuing of printed propaganda showing the economy of using the motor truck and along every line that will aid the public in understanding the economic necessity of further use of the motor truck in solving the country's transportation problems.

**Bureau of salesmen.** A record will be kept as nearly accurate as possible of all salesmen in the industry, whether representing dealer, distributor or factory, that employers wishing to take on new men will have his record available. In furnishing records of prospective employees to employers no comment will be made by the association, it being the intent merely to furnish the employers with the facts in the applicant's past history as a guidance in his selection. This bureau has already saved members of the associ-

ation considerable money through furnishing the records of men not desirable in the industry.

**Trade ethics.** The association will endeavor to devise ways and means to do away with the trade-in evil of unethical dealers and will do everything in its power to bring dealer conditions all over the country to the point where dealers may do business in the right way and thereby make money. An appraisal plan is being worked out that will be recommended for use where dealers can get together on it.

**Membership responsibility.** Investigation will be made of all newly organized motor truck companies and if they are financially sound hearty co-operation will be given them in organizing their sales department that it may start right without introducing the bad practices which have often in the past disorganized truck selling conditions and which were pursued through ignorance rather than from unscrupulous motives.

**Advertising.** When finances permit, a fund shall be established for carrying on advertising campaigns for the promotion of the industry through general publicity.

**Research department.** Data pertaining to every branch of the truck industry and every activity, to which it bears relation, shall be gathered by the association for the use of its members and the public at large.

**Foreign sales service.** The association has advised all American consuls in foreign territory of its existence and its aims with a view to co-operating with these officials in every way in promoting the sale of American built motor trucks abroad.

## Will be Busy Year

Manager Whittaker has the new program well under way and already good results are being shown in the various activities promoted by the association. New members are being added from among truck manufacturers who did not feel previously that the association was active enough to attract their co-operation. That this will be a busy year and a productive year for the national organization seems assured.

# SHOW CONFIDENCE IN YOUR PRODUCT AND YOU'LL WIN

Do You Know Yourself? Have You Analyzed Your Good Qualities?  
Have You Analyzed Your Poor Qualities? Would You be a Success?

## Then Strengthen Your Weak Points

Among Other Things Try Especially to Cultivate:

**Vision Patience Self-Reliance Ideas**  
**Poise Purpose Judgment Grit**

By CHESLA C. SHERLOCK

**L**OTS of young men in business call themselves salesmen who have no right to use the term," said a prominent manufacturer recently. "They start out with a lot of enthusiasm, a sort of religious ecstasy, mixed up with a set of 'ten commandments for salesmen' and sales talks and methods galore.

"As they run into the barbed-wire entanglements of actual competition, their enthusiasm runs out like gas from a punctured bag and they sag woefully down—down until they strike earth with a disillusioned bang. Their career as salesmen is measured by the time it takes them to become 'disillusioned.' It takes some the better part of a lifetime, others a few weeks.

### Need for More "Faith and Purpose"

"There is no need for a young salesman becoming embittered or disillusioned. If he does, it is because he has started out under false pretenses; he has gotten off on the wrong foot. I dislike the enthusiastic young salesman. We need less of this hectic enthusiasm in young salesmen and more genuine faith of the old-fashioned sort.

"If you want to talk to a real salesman of this sort, a man who has had the hard knocks and who survived them only because of his confidence in his product, just run over and get acquainted with Clyde L. Herring, of Des Moines."

I wrote Mr. Herring a letter, suggesting a date as to when I should like to talk to him about his career as a salesman for the benefit of others who might profit by his mistakes and his successes. I found he was a very busy man, as he

was then in the midst of a political campaign, having been nominated by his party for the governorship of Iowa, solely because of his business ability, but he suggested that I come to his home a certain Sunday morning and he would be glad to chat with me for the benefit of young salesmen.

A few words of introduction as to Mr. Herring may be of benefit to those who are not acquainted with him. He is today one of the most successful jobbers of automobile accessories in the country. He has been a specialty salesman practically all of his business life. He was the first man to open an automobile accessory business west of the Mississippi, and the second in all the United States.

He started his business career at the age of fourteen and his single tangible asset then was a little red bicycle. Last year he did a business of \$10,000,000 in a restricted territory, covering only a few Iowa counties.

At fourteen, Mr. Herring was living on his father's farm, eighty miles west of Detroit, near Jackson, Michigan. He saw, with that rare insight into conditions which he has possessed all his life, that his father was not making much of a success at keeping the wolf from the door, so he determined to get a job and support himself.

### "Vision" Dictates Broader Field

An advertisement in a Detroit newspaper, inserted by a retail jewelry establishment, asking for a boy, aroused his interest.

"I determined that I wanted that job," he said, "but I read a little deeper into

the advertisement and discovered that the first boy to reach the store **the following morning** who met the qualifications would be given the position. I had no money for train fare; I was eighty miles from Detroit. What was I to do?

"Then I thought of the bicycle. I decided that I could ride the eighty miles in time to reach the store when it opened at 8 o'clock, so I went to bed, but I slept little. I remember getting up before dawn, eating a breakfast and starting off as soon as it was light enough for me to see the paths through the woods, my mother standing, watching me and wishing me God speed."

### "Grit" Demonstrates Its Importance

Young Herring reached Detroit in time to land the job. The grit that he displayed then as a boy in overcoming the greatest obstacle then presented in his life has been strikingly evident throughout his business career. He has turned every obstacle, every hard knock to advantage, just as he did in this case.

For four years he served his apprenticeship until he became an expert watch maker. This training gave him patience and intensified his natural grit, for who, in all the realm of human endeavor, has to be as patient and painstaking as a watch maker?

At eighteen he went to the head of the institution and said to him: "I have learned the practical side of the business from the ground up. Now I want to get into the selling department. I don't like to sit at a bench all day long. I want to be a salesman and sell goods—it calls for more initiative and action."





He was given a position in the diamond and watch department. He knew so much about the business from his long apprenticeship at the bench that within three years, or when he was twenty-one years old, he was made head of that department.

Then his health failed. The doctors told him very plainly that he was seriously threatened with tuberculosis and that he must go West. "If you do not," they added, "you will not live the year out."

#### How "Patience" Enters the Scene

Young Herring, just getting a good taste of practical salesmanship, decided that life was too sweet to lose just then. He heeded the medical man and went to Colorado.

"I went away up in the mountains," he said, "as far away from civilization as possible. I got a job on a cattle ranch, figuring that that would be the best place in which to 'rough' it and get my health back."

Within three months young Herring found that his health was mending. With that assurance his natural desire to play the game of a salesman reasserted itself. He looked around. About the only tangible commodity in the entire country was cattle. The thought that came to him was logical: Why not get into business here with cattle?

"Just then," said Mr. Herring, "I ran into a fellow who had gone into the cattle business full of enthusiasm and dreams as to the fortune he would make. He had more enthusiasm than faith. A streak of bad luck had made it necessary for him to mortgage the herd and he was discouraged—his enthusiasm had ebbed and was leading him in another direction. He was anxious to 'let go.'"

"He let me have the herd merely for shouldering the obligations which he had incurred and he stepped out. Within a few months there came a turn in the cattle market and I sold out. When I paid all the debts I had assumed, I found that



**Clyde L. Herring**

One of the most successful jobbers of accessories in the country. He has been a specialty salesman practically all of his business life

thoroughly sick of the word "mortgage" and he declined to have anything more to do with one.

"I am going to foreclose just the same," he said. But he added: "However, I have faith in you, young man; bid in the ranch for \$17,000 at the foreclosure sale and I'll loan you the money on your personal note."

#### His Faculty of Visioning Never Waned

Herring prospered. He never lost sight of the fact that he was a salesman. He constantly studied market reports from different cattle markets and he found that



the corn-fed cattle from the corn belt were constantly commanding a higher price than range-raised and grass-fed cattle, such as he was producing, sold for.

#### Inception of an "Idea" Gives Another Boost

Then the idea came to him: Why not buy a farm in Iowa, ship my range-raised cattle there, finish them off on corn for a while and then get the better price at market? No sooner said than done.

He went to Cass County, Iowa, close to the Omaha market, where land was cheap, and bought a large farm. Then he sent to Michigan for his father to come down and manage that farm for him.

But again he ran into an obstacle. He found that his grass-raised cattle could not be finished off on corn at a profit. It looked like he had been caught holding a big bag. Just then a party of Berlin capitalists came to Colorado looking for a chance to invest money in a profitable business.

The young salesman lost no opportunity in turning his talents to account. How well he succeeded is conveyed in the single statement that he sold his Colorado ranch, just three years after he had purchased it "on a shoestring," for \$47,000, or a clear profit of \$30,000 to himself.

The two first rungs he had mounted on the ladder to success, it will be noted, he won merely because he had faith where others in similar positions had lost their enthusiasm.

#### "Judgment" and "Self-Reliance"

Then he came to Iowa, determined to produce corn-fed cattle exclusively in order that he might win the best prices the market afforded. His health was not yet fully restored, but practically so. He determined to play safe, however, and spend a few more years in the open.

For three years more, or until he was twenty-seven, he continued to personally operate his large Iowa farm and to produce cattle for market. The health which had seemed so remote only six years before was now fully restored and he was a husky, robust fellow who had nothing more to fear from tuberculosis. Instead of sitting down those six years and moaning his fate he had continued to play the game of salesmanship with such chess men as had been placed in his hands and he had won \$38,000 profits in two deals and his Iowa farm to boot.

Then he saw an automobile one day. He saw it through the eye of a born sales-



man, which means that it spelled OPPORTUNITY in big letters to him.

He went to his father and said: "I've got my health now and I want to get back into business again. I want to sell things. You stay here and run the farm and I'll go to town."

"What are you going to sell?" asked the father.

"Automobiles," was the simple answer.

Young Herring remembered having heard of Henry Ford while still in Detroit, so he wrote to him and asked for a carload of cars, which happened to be three.

"They arrived in Atlantic on Saturday morning," said Mr. Herring. "I decided to keep one for myself and I learned to run it in a couple of hours. Then I went to the local banker and asked him to give me the names of farmers whose notes he would like to have at 8 per cent. As these men came to town the banker would point them out to me. I would take them out for a ride and suggest that they give me their notes for the purchase price. That evening I had sold the two extra cars."

Then came the real "meat" of Mr. Herring's comments on salesmanship. He



I had \$8000 to the good. Since I had taken the herd on absolutely nothing I thought that my fortune was made."

The young salesman determined then and there to get into the cattle business. He hunted around for a ranch and he again found a fellow whose enthusiasm had cooled and who was sick of his bargain. This man had mortgaged his ranch for \$17,000 and the bank was about to foreclose.

Herring agreed to assume the mortgage and the old owner got out of the country, glad to be free. Then young Herring, now twenty-two years of age, went to the banker and asked to have the mortgage extended, but he had not reckoned with this banker. The latter was

sat for some seconds as if absently dwelling upon some episode of his early days in the automobile jobbing business. Then he said, "You cannot succeed as a salesman, I don't care what you are selling, unless you have confidence or faith in your product, and are able to convince other people of that confidence. You cannot sell goods unless you get the confidence of your prospects and the best way to get that confidence is to show them that you have confidence in the goods yourself."

How did Herring do this? He built a \$5000 building in Atlantic and spent a total of \$25,000 before he ever asked another soul to buy a single car from him. People laughed at him; they sympathized with him; consigned his embryo business to failure, but when he went right

ahead completing his plans and spending more money, never letting his enthusiasm ebb, they commenced to say: "There must be something to this automobile, or he wouldn't be getting such a salesroom ready." That first year young Herring sold sixty-six cars.

#### Don't You Think This is Worth Early Effort?

Later he opened a branch in Council Bluffs and finally came to Des Moines, in order to get a wider distribution. When he started in Des Moines about ten years ago he employed two people and had a rented store room. Now he has two mammoth buildings of his own, one occupying half a city block and ten stories high, the other about half that size. He

employs 400 people now on a profit-sharing basis.

Last month he increased his capitalization from \$300,000 to \$1,500,000, to which it had grown from the original \$25,000, every cent of which represented earnings from the business held as surplus from year to year. His annual profits paid out to himself and employes in the form of dividends rest only in the imagination.

Throughout his life Clyde Herring has been, first of all, a salesman. He has a right to that title, the highest now in the business world, because he has ever kept his faith in his product, regardless of the direction in which the tide was running, or the tendencies of those about him. Hard knocks he took apart to see how they could be turned to advantage and then acted.

## What Will be the Effect Upon the Truck Manufacturers?

To the Editor:

I note that some parts manufacturers are planning to establish service stations through which they will furnish replacement parts for the different units they supply to the truck manufacturers.

I have been figuring for several years on entering the business of manufacturing trucks, but have delayed for several reasons, some of which are:

That the parts manufacturers are not yet on an economical production basis.

That the parts manufacturers have not yet worked out a sales plan to encourage the investment of capital in the manufacturing of trucks. That the parts manufacturers cater to large truck manufacturers that build in quantities for national distribution to the disadvantage of the small or local truck manufacturers.

That the time is coming when trucks will either be built by a few large manufacturers or by small companies for localized distribution. That if the few large companies get control of the truck manufacturing business, many of the parts manufacturers will go out of business. That the building of light trucks is now practically controlled by one manufacturer.

That the only field left for the parts or truck manufacturers is  $2\frac{1}{2}$  tons and over.

That the parts manufacturers for the good of their business should reverse their sales plan and make a lower price for their parts to small truck manufacturers rather than a low price to the large manufacturers and penalize the smaller manufacturer.

That the parts manufacturer would be better off with many small accounts than a few large ones.

It is my opinion the parts manufacturer should not furnish replacement parts direct to the truck dealer or truck user, for the reason that the replacement business and profit is a part of the truck manufacturer's business.

That the profit from the sale of parts is necessary to carry part of the expense of service.

That the parts business is an incentive to invest in the manufacturing of trucks and that the elimination of the replacement parts business will be the means of greatly lessening the number of companies manufacturing trucks, and that the replacement business has kept many companies in business during trying periods.

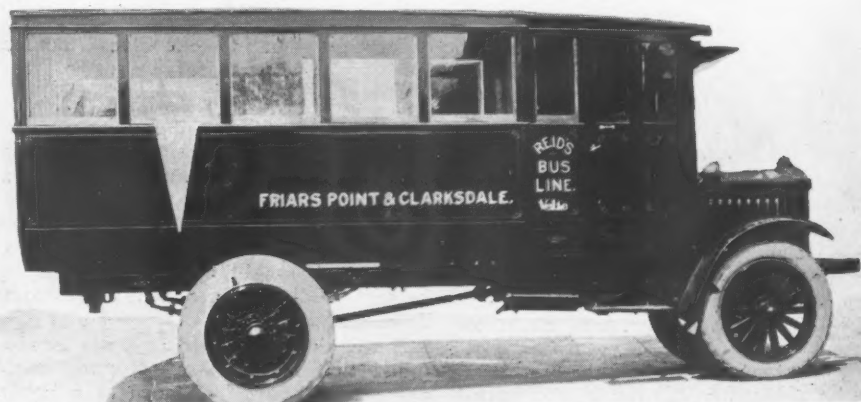
I predicted several years ago that trucks would be manufactured at some time in the future, either by a few large manufacturers, made up of a combination of parts manufacturers or manufactured by many small companies who are building trucks for local consumption, the same as wagons are built by local wagon builders, and, I believe, that the latter plan is the one that is the life of the parts manufacturers except those parts manufacturers that may combine and be successful in forming combinations strong enough to control the manufacturing of trucks, and I believe that the sooner the parts manufacturers work out some plan that will encourage the manufacturing of trucks by local builders the sooner will their business become staple.

Now I thoroughly agree with the parts manufacturers that it is absolutely necessary to give service to the truck users, but I do not believe that service can best be given by the manufacturer of the part. I believe that it should be given by the manufacturer of the truck, the one who has recommended the particular unit that is incorporated in his truck, and who directly, or through his distributors or dealers, is in a position to personally see under what condition the truck is operated.

While it is true there may be many trucks in operation whose owners cannot get the service from the original manufacturer or the manufacturers' dealers for the reason that the manufacturer has gone out of business, if the units used in that truck are standard units the service can be given by other truck dealers who are selling trucks in which the same units are used.

WM. F. HUDSON, President.

Hudson Motor Specialties Co.



Those Who Ride in This Sixteen-Passenger Bus Find It Very Satisfactory in Regard to Both Its Convenience and Riding Comfort

This public conveyance is one of many operated in accordance to the accepted system governing Bus operation, by a Western company. The specially constructed Bus body is mounted on a one and a half ton Velie chassis



# GIVE THE CUSTOMER A WALLOP!

## Don't be Afraid to Assert Your Rights!

**S**AY, if there's anything that makes me sick it's one of those 'weak sister' salesmen that lets the customer tell him what he wants and what the price ought to be, and what ought to come with the truck at HIS price and all that. Listen, men, from now on and for evermore we're going to sell trucks in a different manner."

It was at one of the usual Monday morning gatherings of the sales force during which the old man, G. B. Hastings, president of the Hastings Truck Co., was holding the floor.

"First of all we have got to get it out of our systems that the time is soon coming when the buyer will again chase the dealer. That time is gone, boys, gone forever. The new prices that the factory wired in last week are going to stand for some time. They're guaranteed to us for the next year, and by all that's good and holy we're going to guarantee them to our customers. By that I mean no more shading of prices to this fellow and a lot of extras to the other fellow. We're going to come right out into the daylight and let the sun shine on our business — all those little scare germs, pessimistic microbes and other excess baggage are going to be thrown out."

Old man Hastings was well warmed up by this time and after a few minutes of arm waving and a general tirade on the actions of certain lost brothers of the sales force who had recently departed gracefully, if not reluctantly from the Hastings payroll, he came back to earth and began to assume his normal dignified attitude.

"Now, gentlemen, the time has come when we must realize that we are no longer in this business for love. We must make money from the sale of motor trucks. Honesty is still the best policy. There's no reason in the world for selling motor trucks on any other basis than that by which honest merchandise is sold.

"Therefore, if an old customer or a prospect wants you to depart from your terms and wants you to listen to a business deal which is contrary to good business principles, you have my permission to go to it and tell him where he gets off, and there'll be no questions asked.

"It's going to be up to you to take a wallop at him. Such a customer must be gone after with sledge hammer blows in a diplomatic manner and be educated to the fact that it is dishonest, unjust and unfair to you and your company to expect you to agree to such a proposition. Why is it that we have so many failures and changes in agencies? Simply because you're ready to talk price **before you sell him on the advantage of a truck**, how it will increase his business, etc. You're set on unloading a truck on him regardless of size or adaptability to his business. From now on every man must turn in a report which gives the whole ins-and-outs of

velop your backbone. You have got to sit down and discuss this price cutting business with the customer in an intelligent inoffensive manner. You've got to show him that motor trucks cost real cash, that the labor put into them was paid for in cash, that the running expenses are cash and what is true of motor trucks is also true of his business. Ask him how he would like to deal with a house that **will give away all its profit**. Can such a concern survive, can such a concern give service? Not much.

"Remember that this house is still delivering first class service and that we are going to continue to do so. But service

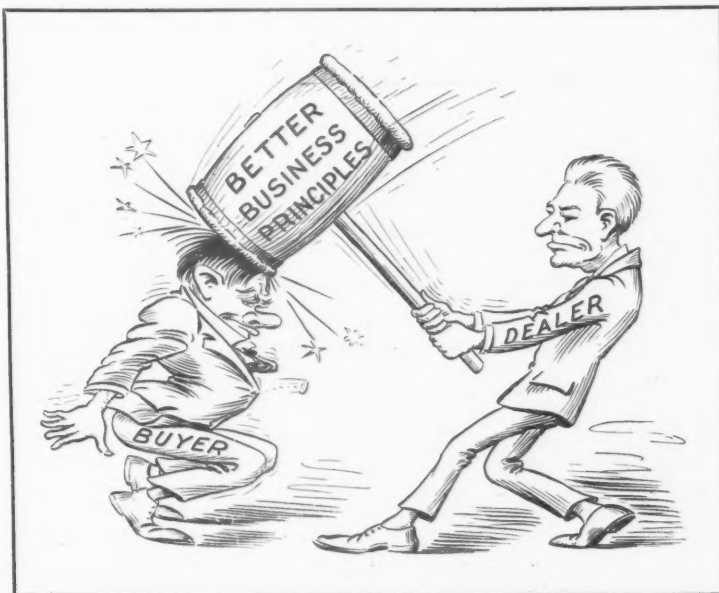
costs money. It costs money to pay the overhead of the service department each month. How are we going to make the service department pay if we don't sell our trucks at a legitimate profit? From now on the new order of things I have outlined, will hold good. And there'll be no variations or 'buts' to the rule.

"One thing more—when a man expects to buy a motor truck by paying only a few dollars down and then run his payments for a number of months, he knows down in his heart that he cannot afford to run his OWN business that way. If he's honest and has been in business for any length of time, he naturally has been doing business with his own bank, and they will give him credit. There's no use of our assum-

ing all the obligations.

"Business can only be done one way in the future and that's the right way. We must sell our trucks on the terms of payment that they should be sold, and then we can continue to give the service that we have promised. Well, I guess that's all for this morning.

"Oh, yes, there's one thing more I want to remind you of. I want all you men to read the June issue of the 'Commercial Car Journal.' It's going to have a lot of dope in it about service. It will give you fellows some reasons why you shouldn't make a whole lot of rash promises about service."



what your customer is going to do with his truck."

At this moment one of the junior salesmen raised the objection that he "couldn't see why we should worry about the owner's business."

At this remark, old man Hastings began to froth again.

"Listen, son, did you ever realize that selling a two-ton job to a concern that expects to continuously haul three and a half tons will soon put that job in the junk pile? And even if we got twice the price for such a sale we would never come out of the mess without the Hastings Company getting a black eye in the opinion of that customer. The Hastings Company is going to know just what its trucks are doing from now on.

"Furthermore, gentlemen, you must de-

**Watch For Service Number**



# ARE YOU HELPING THE FARMER

## Shorten the Distance Between His Farm and the City Market?

By THOS. H. WITTKORN

**I**F you believe in the slogan "1921 Will Reward Fighters," possibly you can get some ammunition from the way motor trucks have come to the rescue of the farmers who grow a large part of the "eats" for Philadelphia.

When the city was young the "truckers" lived only a couple of miles from the central wholesale markets and found no difficulty in transporting their products. As the city grew, however, they were slowly but surely crowded farther and farther away from their market. Hauling finally became a bigger problem than producing, but during the past few years motor trucks have overcome this handicap of distance.

Indeed, motor trucks have made an entire change in the style of farming in the outlying districts of the city. A few years ago 15 miles north of Billy Penn's statue was a grain-raising district, now it is one big market garden. The farms now stretch to points 15 to 30 miles from the City Hall, and are again changing from dairy and grain to intensive gardening. This change will be more rapid than the first one, as motor trucks have widely extended the area for hauling perishable products. The men who are now farming \$1000 an acre land will not hesitate to sell and move farther out when the opportunity presents itself. Similar conditions obtain in all cities of the Union where an increasing city population has compelled the farmer to vacate earlier holdings for farms farther out. In instances like these the farmer's only salvation from consequent transportation difficulties is the truck.

### Statistics Indicating Growing Appreciation of Truck Hauling Economy

The statistician of the Pennsylvania Department of Agriculture, L. H. Wible, says that on January 1, 1920, there were 355 automobiles and 283 motor trucks on the farms of Philadelphia County. This impressive comparison, however, loses some of its import when compared with some of the strictly agricultural counties of the state, but it is interesting in that it is the only county in this state where there is such a small comparative variation. The lack of variation is traceable to one thing, the realization and acceptance of the farmers supplying Philadelphia, of the economy of the motor truck over the horse in hauling their produce to the city's core. The average for the whole state is nearly 8 to 1, counting the machines, only on the 202,298 farms.



Recently the writer spent two days traveling in the territory around Bustleton, the heart of Philadelphia's farming section, and of all the farmers of any consequence only four did not have motor trucks. All the other growers are using trucks ranging from the ever-present Model T to 5-ton Macks, according to the size of their farms. The most popular capacities are the 2 and 2½-ton models. The horses have not disappeared entirely, as some over-enthusiastic motor salesmen like to think, but they are being used to better advantage.

### Time Saving Largely Responsible for Change

Improved roads, from farm to market house, are partly responsible for the change in method of marketing, but the chief reason is the saving in time of man and horse. It used to take a hired man and two or four horses a day's time to go to market, but now it is done by the boss between supper and bedtime. The man formerly trusted with this work was the highest paid employee. He generally left home about 6 o'clock in the evening and did not get back until four or five the next morning. This meant he had to have a meal on the road for himself and horses, which not only cost money but increased the risk of loss through improper care of the team. The day he came home both man and team would have to rest for the next trip, so the owner lost their services on the farm.

The plan today is to load the motor truck in the late afternoon and after a good supper the owner leaves at 6 o'clock and is back at 10 o'clock or earlier. He gets a full night's sleep, saves the wages of a man, gets more work from his horses and has the satisfaction of marketing his own produce. Under this arrangement the farm horses do no market hauling and

but few are shod. At one time there were three horse-shoeing shops in the village, now there is none. As one farmer aptly expressed the situation, "The money we used to spend for horse shoes now goes for gas." Several others elaborated on the half day's time of man and team saved since the abolition of these shops.

### The Whole Thing in a Nut Shell; Economy in Time and Money

Will the farmer go back to the horse? Not those who now possess trucks. Once a truck owner, always a truck owner. The proposition simmers down to this: Sell the farmer who is still practicing obsolete hauling methods, show him how he can save money and you have established a spirit of good will that will bring you another life long prospect.

That the farmer gets long service from his truck can be proved by the case of Corwin Starkey, who intensively farms a hundred acres. He is still marketing his crops with a truck he bought in 1915; in fact, the original rear tires are on it. Except for a leaky radiator and new brake bands, he told me, it has not been in a service station. It is rated 4500 lb. capacity, although he generally hauls 5000 and often 5500 lb. Sugar corn, lettuce and spinach are his three most perishable crops, but with the truck he gets them to market in two hours, where it used to take six or eight. With sugar corn, especially, this makes a wonderful difference because it heats very quickly and loses all its sweetness when a great lot of it is piled together.

The return load problem, always a big factor, works out splendidly for market gardeners. Their big hauling problem to the farm is stable manure and the truck has solved it for them.

In many cases the farmers are able to arrange with stablemen to get the manure merely for the asking and agreement to haul it away regularly, so that it will not become a nuisance in the city. The big savings comes in not having to unload a freight car (which was the way the farmers formerly got the stuff), when other work is pressing, getting a better quality of manure and not having to pay a big freight bill.

#### Little Custom Hauling Done; They Own Their Own Trucks

As practically all the farmers in the Bustleton district have motor trucks, there is comparatively little custom hauling done—that is, by men who make a business of it. A lot of farmers haul for their neighbors when each of them do not have enough for a full load and generally charge 7 or 8 cents for each basket. In case of an emergency a truck

and driver to haul a 3-ton load to market can be hired for \$10, but the great bulk of the crops are hauled on the grower's own truck. One man makes a business of hauling stable manure by truck out to the farms, but his tonnage is a mere drop in the bucket compared to what the farmers haul.

The most impressive feature of the motor truck proposition in this district is the fact that a large percentage of the farmers have one particular make of truck. It is especially remarkable because it comes from a distant city. If it was of local manufacture, in which case the owners would be assured of good service, it would not seem so queer. But the fact is that the man who sold these trucks had been a well known and reliable wagon builder, and his father before him was noted for his skill and integrity along these lines. Real market

gardeners will tell you there are vital differences between a trucker's and a farm or market wagon, so they are particular who builds them. When motor trucks came it was only natural that this man took an agency for one and as a Bustleton grower said to me; "He said he would give us service with the trucks as well as his skill in building bodies, so why shouldn't we give him our business after he had treated us so square with his wagons?"

#### You Can't Emphasize It Enough; Get His Confidence

That last statement seems to be a secret of selling trucks to truckers and farmers also. It is easier to sell them through concerns or individuals who have had the farmers' confidence and trade than it is to depend on strangers to them who are always under suspicion no matter how reliable they may be.



## Our London Letter

By OUR SPECIAL CORRESPONDENT

#### Big Pneumatic Tires for Active Military Service

Military opinion in Europe is mostly based on the lessons of the war. It is generally recognized that in the future military efficiency will depend on mobility and equipment, and the side possessing the army most responsive to quick movement is the side most likely to end the war in the first few weeks. Trench warfare, it is hoped, will be impossible. Everything points to a faster and, therefore, lighter type of vehicle, and for this reason European military authorities are watching the development of the pneumatic tire for heavy vehicles with intense interest.

#### Railroads Want Road Transport

The powers of railroad companies in Great Britain are strictly limited, and having at last awaked to the possibilities of road transport, which they find is in many ways ousting the rail, these companies are trying to obtain government sanction to run automobile services. This move has aroused a flutter and road interests are strenuously opposing what they maintain might develop into first of all a crushing out of smaller interests and finally a dangerous monopoly.

As the state control of railways and state financial guarantees come to an end next August, there is every prospect of the railway companies being compelled to reduce expenses by cutting down

train frequency and closing many wayside stations. The latter will be no great loss, for their existence is the result of former transport conditions, and now that the truck has supplanted the horse fewer stations with larger distribution areas should rather effect a national economy. In any case, if train and station service is diminished, a greater opening will be extended to the automobile.

#### Results of Working Over 2000 Buses

The yearly operating results of the London General Omnibus Co., which is conceded to be the largest omnibus organization in existence, are very interesting

because of their immensity and those for 1920 are no exception. During these 12 months the company has carried nearly 770,000,000 passengers over 86,000,000 miles, which is an increase of almost 100,000,000 passengers and 10½ million miles over the total of the preceding 12 months, but the average fare of 2.04 pence shows only an increase of .17 pence over 1919, in spite of a big rise in fares during the last three months. Unfortunately but little detail particulars of the working costs are available. It is, however, generally known that the company is paying 2 shillings a British gallon for gasoline and an exceptionally low figure per tire mile.

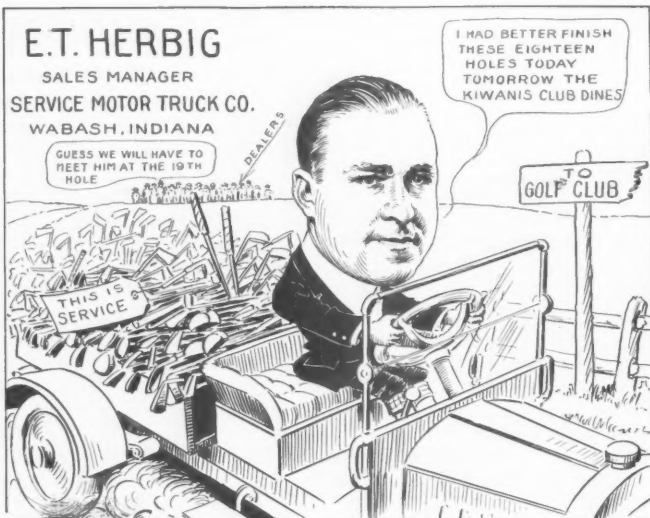
#### Aluminum Chain Mail as a Tire Protection

In connection with pneumatic tires the latest English development is a tire armored against punctures by a layer of aluminum chain mail. This has been brought out by Tye Tyres, of 28 Victoria St., London, S. W. I. It is pointed out that one of these tires has traveled 16,000 miles without a blow-out or puncture. As yet, it has not been definitely established whether the working of the tire and consequent possible play of the chain mail leads to any wear or disintegration in the tire construction, or to what extent the resiliency is affected, which, of course, is difficult to measure, but the additional weight is only 1 to 2 lb. for a 3½-in. tire cover.

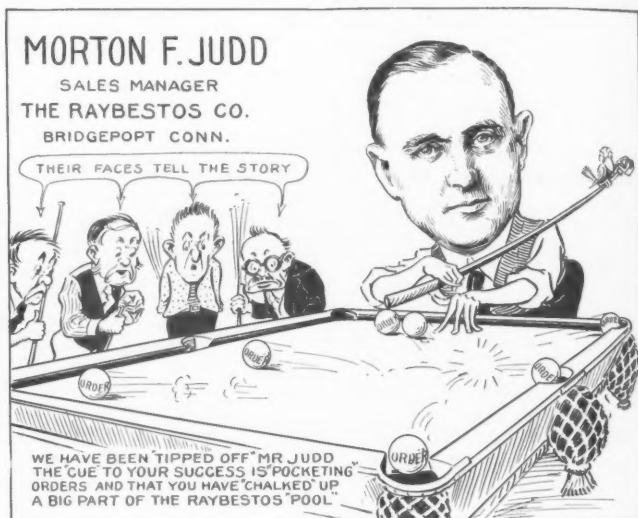
Are not your service methods antiquated? Haven't you neglected it and let it shift for itself for years? Isn't it a fact that service and success go hand in hand? If you honestly believe that there is room for improvement and that the methods you pursue in rendering service are far from hitting the mark of consumer satisfaction, then by all means get acquainted with the subject from all angles. Know the June issue and you'll know service, and incidentally construct the bulwark of success.



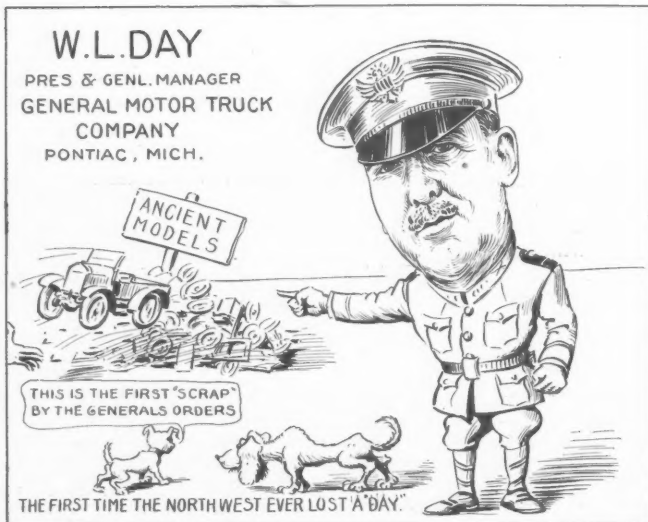
## FRIENDLY TIPS ABOUT SOME "BIG ONES"



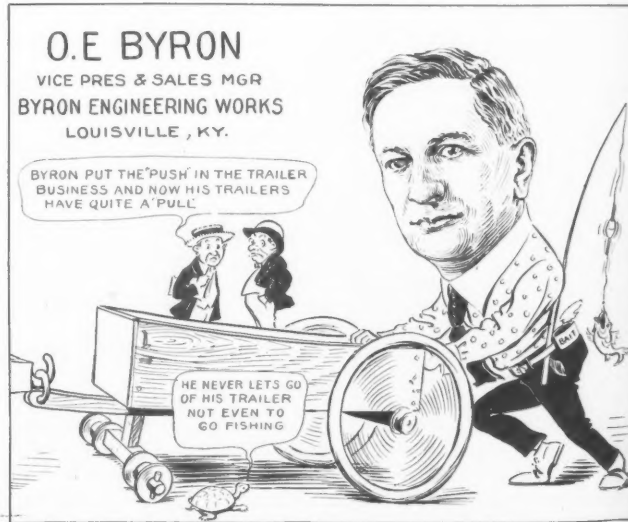
**E. T. Herbig**—After Dayton, Ohio, High-School education, attended Annapolis Naval Academy. Following schooling, Herbig joined the National Cash Register Company, later going with the Bell Telephone Company. In 1916, he became connected with the Service Motor Truck Company, of which he is now Sales Manager. Mr. Herbig was one of the founders of the National Association of the Motor Truck Sales Managers, and takes an active interest in the National Automobile Chamber of Commerce, being chairman of its service committee for a time.



**M. F. Judd**—For five years Assistant to the Vice-President and Sales Manager, of the Bullard Machine Tool Company, Bridgeport, Conn. Following this connection, Mr. Judd went into business for himself, specializing in illustrating and advertising for 2½ years. Then for three years as Sales Manager of Equipment Division, American Optical Company, Southbridge, Mass. For the past five years he has been Sales Manager of the Raybestos Company, Bridgeport, Conn.



**W. L. Day**—Born in Illinois; first position with Deere Mansur and Company, predecessors of the John Deere Plow Company. He started activities in this firm's warehouse and was soon promoted to the position of shipping clerk. Shortly afterwards he took charge of the warehouse of Trumbull, Reynolds & Allen, jobbers, of field and garden seeds, and the P. & O. line of farm implements. He then became a salesman for the Parlin & Orendorff Company out of Kansas City branch office. Finally was made Assistant Manager of this branch. In 1911 he went to Racine, Wisconsin, as General Sales Manager of Mitchell Motor Car Company. Shortly afterwards, Mr. Day was appointed by the General Motors Corporation to take charge of the General Motors Truck Company of which he is today President and General Manager.



**O. B. Byron**—Served his apprenticeship as a machinist after which he took a course in mechanical engineering, then became associated with the Grabowsky Motor Truck Company in 1909. In 1912 he became Factory Manager for New Dominion Motors Company of Walkerville, Ont., Can. In 1914 he became General Manager of Detroit Trailer Company. In 1917 appointed Chief Engineer and Factory Manager of the Lee Loader and Body Company Chicago. Early in 1918, he was Consulting Engineer on trailer design for the Engineering Division of Quartermaster's Corps of Washington. Later was commissioned Captain of the Q. M. C. and given charge of inspection of Class "B" Motor Truck material in New York District. After discharge from service in 1919, became associated with Byron Engineering Works, and at present is Vice-President and has charge of Engineering and Sales for this company.





# EDITORIALS



## Time Means a Lot to the Farmer

**I**N the recent survey made by the United States Department of Agriculture of the truck situation among eastern farmers, details of which are given elsewhere in this issue, two facts stand out prominently in favor of the truck, notwithstanding the general disadvantages attributed to poor roads. Time is just as important to the farmer as it is to the city merchant or the banker. Some individuals labor under the delusion that the farmer has plenty of time to spare, but such is not the case, especially with the eastern truck, dairy, fruit and crop farmers. These farmers are forced to save time not only because of the perishable products they sell, but because they are selling products on which the market prices fluctuate constantly—the competition is keen.

As compared with horses the trucks save from half to two-thirds the time required for hauling to market. If our roads were up to par one of the principal disadvantages to the use of the truck as seen by the farmer would be entirely eliminated.

Another point which dealers should not neglect to bring forcibly to the attention of the farmer is that with the truck, as the hauling medium for his farm products, he can move further away from the city market and increase his profits because of cheaper acreage. With a truck the farmer can also go to a better market. Incidentally, he can also rid himself of the disagreeable duties connected with valet services he must otherwise render unto horses.

## The Right Man for the Job

**M**UCH of the trouble experienced by the dealer is not securing parts ordered from the factory promptly is directly traceable to the dealer's own negligence in not giving the proper parts number, not using the proper order form furnished by the factory and in writing letters that lack intelligent information. But the dealer is not at all times to blame. A great deal rests with the factory parts department head, who, in many instances, is not capable of handling the parts and service departments properly. Needless to say, his job is one of the hardest in the whole works. When everything runs smoothly he is never given credit, but when parts are sent out wrong he hears about it from the dealer and about everybody else. In most cases he

is not remunerated adequately, consequently the right man cannot be held in a position which does not offer sufficient compensation.

The factory service man should be a remarkably good letter writer. He should be a diplomat in the sense of the word and be able to write to the dealers in such a way that the latter will co-operate more and more with the factory, and not be the means of antagonizing them. The same thing applies to the dealer's service station manager. Picking a man out of the shop because he is a good mechanic does not insure the dealer that he is in the possession of the right man for this department. If more attention were paid to securing the proper man for the parts and service department the factories would have less trouble, and a better feeling would exist between the factory and dealer.

## President's Message a Stimulus to Truck Industry

**T**HAT President Harding is fully aware of the country's needs in transportation and highway matters is unequivocally shown by that part of his message to congress, in which he states "that highways are not only feeders to the railroads and afford relief to their local burdens, but that they are actual lines of motor traffic in interstate commerce."

He further asks that the laws governing Federal aid be amended and strengthened, and "that Congress should prescribe conditions to Federal appropriations which will necessitate a consistent program of uniformity which will justify the Federal outlay." This is something urgently needed.

It is gratifying to note that the country's highest executive has given this subject his earnest attention and it should be the means of stimulating those directly concerned with the problems to a greater zeal in performing their duties relative to the important work of highway building. President Harding also decries the existent policy of building roads without proper consideration being given to maintenance. This is undoubtedly one of the most important conditions which must be remedied in connection with Federal aid.

Summed up, President Harding's remarks are encouraging and show that the head of the present administration is fully sold on the advantages of good roads to this country—which indirectly means more motor trucks on the roads.

# News of the Trade in Brief

(For Factory Items, Personals, New Incorporations, Etc., See Pages 87-88)

## M. & A. M. A. Report Shows Big Improvement in the Industry

A month's sustained and unbroken progress in the onward march of the automotive industry is reflected in the May analysis of conditions made public by the Motor and Accessory Manufacturers' Association.

"The gratifying betterment of fundamental factors noted in last month's survey is increasingly manifest in the first-hand reports and authoritative financial data consolidated in the summary for the month of April," comments M. L. Hem-inway, General Manager of the Association.

"Payments for the last month have been better than for the three months prior," says the report. "More firms are paying their current accounts in full on due date, and an increasing number are paying a larger proportion of their notes as they fall due, quite a number paying in full.

"Releases on old orders show a decided improvement. Many of the car and truck manufacturers are placing orders for new materials. Virtually all the car manufacturers are now showing signs of life, and this applies to the manufacturers of trucks and tractors to a somewhat lesser degree.

"Quite a number of vehicle manufacturers are operating their plants at full time or nearly so. Labor conditions in the automotive industry seem to be causing comparatively little trouble. There is a marked increase in labor efficiency following the re-adjustment period."

These statements loom up conspicuously in the chart of automotive trends plotted with the greatest possible precision by the credit and financial executives of the principal manufacturers making parts, units and accessories for the passenger car and truck builders. Close to four hundreds of these parts-purveyors are affiliated with the Motor and Accessory Manufacturers' Association.

"Altogether," says the report, in recapitulation, "there is a decidedly better feeling among our members. Collections are better and money required from banks seems to be somewhat easier. Many plants are resuming operations on a larger scale than heretofore, and the condition of extreme depression has certainly changed for the better."

Makers of automotive accessories and the smaller replacement parts report an unusually large volume of business from dealers and jobbers.

A first-hand up-to-the-minute report on automotive business conditions on the Pacific Coast was telegraphed to the Association's headquarters by Ezra W. Clark, Advertising Manager of the Clark Equipment Company, Buchanan, Mich., who is making a speaking tour across the continent, addressing local dealers' organizations and Chambers of Commerce. He is also placing on exhibition his oil-paintings on "The Spirit of Transportation" by twelve of the leading artists of America, who portrayed on canvas their "conceptions of the dynamic force of civilization-transportation."

"Business conditions on the Pacific Coast show decided improvement," telegraphed Mr. Clark. "Good demand for heavy trucks for highway construction and light trucks for agricultural use."

## President Sees the Need of a Readjustment of National Highway Program

That President Harding fully recognizes the importance of highway transportation for the economic health of the country is realized when one reads the extract on road improvement from the Message to Congress:

"The highways are not only feeders to the railroads and afford relief from their local burdens, they are actually lines of motor traffic in interstate commerce. They are the smaller arteries of the larger portion of our commerce, and the motor car has become an indispensable instrument in our political, social and industrial life.

"There is begun a new era in highway construction, the outlay for which runs far into hundreds of millions of dollars. Bond issues by road districts, counties and states mount to enormous figures, and the country is facing such an outlay that it is vital that every effort shall be directed against wasted effort and unjustifiable expenditure.

"The Federal Government can place no inhibition on the expenditure in the several States; but, since Congress has embarked upon a policy of assisting the States in highway improvement, wisely, I believe, it can assert a wholly becoming influence in shaping policy.

"With the principle of Federal participation acceptably established, probably never to be abandoned, it is important to exert Federal influence in developing comprehensive plans looking to the promotion of commerce, and apply our expenditures in the surest way to guarantee a return for money expended.

### SHOWS

**September, 1921—Sacramento, Cal.** Seventh Annual Show during State Fair. Automobile Tent (30,000 sq. ft.). Passenger Cars, Trucks, Tractors, Accessories and Agricultural Implements. State Agricultural Society, Sacramento.

**September 28 to October 8, 1921—New York City.** Electrical Exposition, at 71st Regt. Armory, Park Ave. & 34th St. Exhibit will include electric vehicles. Address Norman Maul, 130 East 15th St., New York City.

### CONVENTIONS

**Atlanta, Ga.,** June 12 to 16, 1921—Annual Advertising Convention. Auspices of Associated Advertising Clubs of the World. Exec. Offices, 110 W. 40th St., New York City.

**Boston, Mass.,** September or October, 1921—Tenth Annual Congress of the National Safety Council.

**Buffalo, N. Y.,** May 17 to 19, 1921—Spring Meeting of the Service Managers of the National Automobile Chamber of Commerce. Hdqrs., Iroquois Hotel. H. R. Cobligh, Sec'y.

**Chicago, Ill.,** May 31 to June 3, 1921—Annual Convention of the National Electric Light Association, of which the Electric Vehicle Section of the Commercial National Section is a part. A. Jackson Marshall, Sec., 28 W. 39th St., New York City.

**Chicago, Ill.,** October 12 to 14, 1921—Annual Convention of the National Implement and Vehicle Association. H. J. Samiet, Sec'y, 72 West Adams St.

## Coming Events

**Chicago, Ill.,** November 14 to 19, 1921—Annual Convention and Business Exhibit of the Automotive Equipment Association at the Coliseum.

**Detroit, Mich.,** June 13 to 16, 1921—Annual Convention of National Team and Motor Truck Owners, Inc., held aboard ship during a cruise on the Steamship Naronic. F. L. Henks, Sec'y, 92 Fort St., W. Detroit.

**Elkins, W. Va.,** November 8, 1921. Semi-Annual Meeting of the West Virginia Automobile Dealers' Association.

**Greenville, S. C.,** July 11, 1921—Semi-Annual Meeting. South Carolina Automotive Trade Association.

**Hot Springs, Va.,** June 8 to 10, 1921—Spring Meeting of the Automotive Electric Association.

**Mackinac Island, Mich.,** July 4 to 9, 1921—Summer Meeting of the Automotive Equipment Association. Address, 1813 City Hall Square Bldg., Chicago, Ill.

**Milwaukee, Wis.,** June 30 to July 2, 1921—Annual Convention of the National Association of Commercial Haulers. C. R. Collins, Gen. Mgr., 1851 Broadway, New York.

**Philadelphia, Pa.,** June 15, 1921—Annual Outing of the Motor Truck Association of Philadelphia, at the Lu Lu Country Club.

**Santa Barbara, Cal.,** June, 1921—General Meeting of the California Automobile Trade Association. Robert W. Martland, Pacific Bldg., Oakland, Cal.

**West Baden, Ind.,** May 24 to 28, 1921—Semi-Annual Meeting of Society of Automotive Engineers, at the West Baden Springs Hotel.

### FOREIGN EVENTS

**Bandoeng, Java, Dutch East Indies,** September, 1921—Second Industrial Fair. Automobiles and Trucks. Netherlands-India Industrial Fair Association.

**Basle, Switzerland,** May 28 to June 8, 1921—International Automobile Exhibit.

**Brussels, Belgium,** December 3 to 15, 1921—Annual Belgian Automobile Show.

**London, England,** June 3 to 17, 1921—Fifth Annual Rubber Exhibit. Royal Agricultural Hall.

**London, England,** October 13 to 23, 1921—Olympic Commercial Car Show.

**London, England,** November 4 to 12, 1921—Olympia and White City, Fifteenth International Motor Exhibition. Apply to exhibition manager, Society of Motor Manufacturers and Traders (Ltd.), 83 Pall Mall, London, S. W. 1.

**Paris, France,** October 5 to 16, 1921—Automobile Show. Grand Palais.

**Prague, Czechoslovak,** May 28 to June 4, 1921—Thirteenth Annual International Automobile Show. Passenger Cars, Trucks, Tractors, Motorcycles and Accessories. Auspices of Czechoslovak Automobile Club. Address Czechoslovak Legation at Washington, D. C.

**Utrecht, Holland,** September 6 to 16, 1921—International Industrial Fair. American Representatives: The New York Chamber of Commerce for the Netherlands and the Netherlands East and West Indies, Inc., 44 Beaver St., New York.



"Large Federal outlay demands a Federal voice in the program of expenditure. Congress can not justify a mere gift from the Federal purse to the several States, to be prorated among counties for road betterment. Such a course will invite abuses which it were better to guard against in the beginning.

"The laws governing Federal aid should be amended and strengthened. The Federal agency of administration should be elevated to the importance and vested with authority comparable to the work before it. And Congress ought to prescribe conditions to Federal appropriations which will necessitate a consistent program of uniformity which will justify the Federal outlay.

"I know of nothing more shocking than the millions of public funds wasted in improved highways, wasted because there is no policy of maintenance. The neglect is not universal, but it is very near it. There is nothing the Congress can do more effectively to end this shocking waste than condition all Federal aid on provisions for maintenance. Highways, no matter how generous the outlay for construction, cannot be maintained without patrol and constant repair. Such conditions insisted upon in the grant of Federal aid will safeguard the public which pays and guards the Federal Government against political abuses, which tend to defeat the very purposes for which we authorize Federal expenditure."

### Buffalo Service Convention

A decidedly promising program has been prepared for the Service Managers' convention of the National Automobile Chamber of Commerce, to be held at Buffalo, N. Y., May 17 to 18, at the Hotel Iroquois. This meeting will be open only to representatives of the factories that are N. A. C. C. members.

This is the initial attempt of the N. A. C. C. along the line of a concentrated service effort.

Preparations are under the direction of H. R. Cobleigh, secretary of service, and the service committee consisting of A. B. Cumner (Autocar), chairman; F. A. Bonham (Chevrolet), J. B. Bray (Grant), F. Van Z. Lane (Locomobile), L. C. Voyles (Marmon), and F. J. Wells (Pierce-Arrow).

Some of the topics to be discussed are:  
How Can We Help Prevent Dealers from Overstocking Parts?

Should a Handling Charge be Imposed on Returned Parts?

How Are We to Meet The Pirate Parts Situation?

On What Basis Should the Dealer Collect the 5% War Tax?

Would a Uniform Telegraph Code or at Least a Standard Set of Code Phrases be Advisable?

How We Handle the "Back Order" Problem.

How Should Distant Dealers Cover Transportation in Parts Prices?

Suggestion for Typical "Car-Care" Schedules for Owners.

Using the N. A. C. C. Service Department.

### Truck Freight Rates Argued Before Classification Committee

At a hearing before the Consolidated Classification Committee at New York, April 18, J. S. Marvin, General Traffic Manager, N. A. C. C., urged that freight rates charged by Western railroads on motor trucks, in carloads, be revised and placed on a second-class basis, subject to a minimum carload weight of 12,000 lb. This adjustment has already been granted by Eastern and Southern railroads. The Western lines charge first-class rates on both trucks and passenger machines. The classification of a number of automobile and truck parts was also under discussion.

Mr. Marvin pointed out that Western railroads concede the rating asked on trucks on their longest hauls to Pacific Coast territory and cited the history of rate making on horse-drawn vehicles, wherein trucks and farm wagons invariably rated lower than carriages. Heavy loading, slight risk of damage and some glaring inconsistencies, whereby the freight charges on trucks exceed the loading of like weight of higher class freight, were among other points made.

Manufacturers, as well as dealers in Western cities, are awaiting the outcome with great interest, inasmuch as it means a difference of from \$40 to \$80 and more per carload on trucks shipped to points west of Chicago, and it is felt that that district is not on an equitable basis compared with other territories.

The Consolidated Committee has entire control of freight classification in all territories under the reorganized railroad system—lines in the West, East and South are represented by three members from each of those districts. A large delegation of motor car and parts makers attended. The decision is expected early in May.

### S. A. E. Standards Committees to Make Their Reports at Indiana Meet

The reports of the S. A. E. Standards Committee Divisions covering their work for the first half of 1921 will be sent to the voting members of the Society in pamphlet form prior to the Standards Committee Meeting, which will be held at West Baden Springs, Indiana, on May 24th. Copies of the reports may be obtained free of charge from the Society of Automotive Engineers, 29 West 39th Street, New York City.

The reports consist of complete but concise statements of the practices and constructions recommended, together with such illustrations as are necessary.

The methods used by the passenger-car and motor-truck manufacturers for testing serviceability of brake-lining vary at the present time so greatly that it is extremely difficult for the brake-lining manufacturers to produce linings that will meet the great variety of tests. Realizing the importance of having some standard method of test generally acceptable to the industry, a Brake Lining Subdivision of the S. A. E. Parts and Fittings Division has been appointed by the So-

ciety, with a personnel consisting of brake-lining manufacturers and automobile engineers.

Data were submitted at the meeting on a series of tests which had been run on a testing machine, having two shoes equipped with brake-lining bearing on a passenger-car brake-drum, the braking area being equivalent to about one-quarter the average braking area of a passenger car. It was decided to build several similar testing-machines in order that all the members of the Subdivision can run a series of tests with a view to deciding upon a definite specification for testing brake-lining after the results of the different tests are compared.

It was the consensus of opinion that any specification adopted should be such that it would not require expensive testing apparatus, and that the establishment of a standard specification would be of great value to the passenger car, motor truck and axle manufacturers.

The Chain Division of the S. A. E. Standards Committee has recommended the adoption of a standard tooth-form, the pressure angle for a 6-tooth wheel running from 15 to 5 deg., and the pressure angle on a wheel of infinite diameter running from 15 to 30 deg., making the actual working face of the tooth a surface concave to the roller, the radius of which is approximately 1.3 times the diameter of the roller.

### Mr. Dealer Are You Overlooking This Sales Field?

There is a very true axiom in life that the obvious is most always overlooked. This is as true in the motor truck business as in any other phase of industrial and business existence.

You may be a dealer near a farming district, where many of your sales are among the rural population. Are you overlooking the gigantic possibilities of community school transportation? Do you realize that this is a field so young yet so fraught with potentiality that some day a far-seeing and energetic dealer is going to make a "killing."

Investigations, official in character, which have been made, show that the consolidated school now found in many country districts represents the most forward step in rural education of recent years; and that the efficiency, convenience and healthful pleasures afforded by it are such as to rob the city school, by comparison, of many if not all of its attractions. If, then, the consolidated school promotes efficiency in education and economy in administration, the wisdom of its extension would seem to be apparent.

While different elements naturally have entered into the success attained by the consolidated school, it is with but one of these, transportation, and this of course means highway transportation, with which this article has to deal.

Truck dealers should investigate their county educational departments, find where the rural community schools are established or are to be established, and see if the system cannot be improved by efficient motor transportation.



## Bartlett Succeeds Sutherland in Splitdorf Company

M. W. Bartlett is the new general manager and vice-president of the Splitdorf Electrical Co., Newark, N. J., the appointment having been made at a board of directors meeting held April 27. He succeeds R. W. Sutherland, who recently tendered his resignation as vice-president and general manager of the Newark company, as well as president of the Splitdorf Electrical Co., of Illinois, of New York, and of Toronto.

Mr. Bartlett is an old face returning to familiar surroundings, in that he originally joined the Splitdorf Co. in 1911 and stayed with it until 1919, acting as secretary of the company for the last six years of association. In that capacity he was favorably known throughout the industry and with the war activities crowding the organization to 100 per cent production, Mr. Bartlett took entire charge of the foreign end of the business, Splitdorf production being exclusive American ignition called for by the Allies.

With the war over, Mr. Bartlett accepted an opening for further development in the export and executive field and joined forces with the Wire Wheel Corp. of America, handling the Eastern interests of the corporation in addition to its foreign market.

## Dabney Now an A. E. S. A. Executive

H. D. Dabney, who is well known in the automobile industry through his past connection with the Society of Automotive Engineers and the National Association of Motor Truck Sales Managers, has accepted the appointment of Assistant Secretary of the Automotive Electric Service Association, with headquarters at 244 West 49th Street, New York City.

The Association is fortunate in obtaining the services of Mr. Dabney, as his past experience and wide acquaintance among the men in the industry, makes him exceptionally well qualified to carry out the plans of the Association, as outlined.

Mr. Dabney takes up the work of Mr. E. E. Turner, Assistant Secretary of the Automotive Electric Association, who has been acting in a similar capacity for the A. E. S. A. since its organization. Owing to its rapid growth, however, it was found that this arrangement could not continue, as it would encroach upon Mr. Turner's time to the detriment of his work for the A. E. A.

## Gasoline Drops in Indiana

The Standard Oil of Indiana reduced its gasoline three cents per gallon throughout its territory, making tank-wagon price 20 cents and filling-station price 22, on April 25. Corresponding reductions in some other products are expected.

## Fuel and Research Sessions to be Featured at S. A. E. Meeting

Automotive engineering interest is directed this month to the state of Indiana and the semi-annual meeting of the Society of Automotive Engineers at West Baden, May 24 to 28. Of the technical sessions at this meeting, the Research and the Fuel Sessions will undoubtedly rank first in point of general interest. Although it has been announced that the visit of Sir Dugald Clerk, the noted British scientist, has been cancelled because of illness in his family, his paper will nevertheless be read and discussed at the Research Session. In this Session will also be included a paper by C. W. Stratford, of the Associated Oil Company, on automotive engine and vehicle lubrication, as well as a description by Professor W. E. Lay, of the new research laboratory at the University of Michigan, to be used in connection with their newly established Bureau of Research Investigation.

The attainment of higher thermal efficiency in automotive engines and the employment of the less volatile oils as fuels will be treated by F. C. Ziesenheim, of Carnegie Institute of Technology, in his paper entitled "Development of a High-Compression Oil Engine for Automotive Purposes." George P. Dorris has developed a new manifold intended to convert the less volatile ends of the fuel into vapor before they enter the cylinder, thus eliminating dilution of the lubricating oil. His paper will describe this, and models also will be shown.

The sports program this year will be one of the most comprehensive ever conducted by the Society, including everything from tug-of-war to croquet, with appropriate prizes. Golf, tennis and trapshooting tournaments are planned, as well as two baseball series. The ladies will find card parties, clock-golf, croquet and tennis tournaments arranged for them, not to mention the dancing contest that has proved so popular at past meetings.

## April Shipments Exceed March by 27 Per Cent

Reports to the Traffic Department of the N. A. C. C. for April from factories producing three-quarters of the total volume indicate that total figures for that month will be 20,000 carloads, 13,800 driveaways and 1,134 boat shipments.

Figuring the driveaways into carload equivalents, the April shipping was 27 per cent greater than March and 71 per cent of April, 1920. Last year April decreased 23 per cent under March.

While the railroads carried more automobile shipments in April this year than last year during car shortage and strikes, the difference in production is accounted for in the driveaways. The figures are:

	Carloads		Driveaways (Mchs)		Boat (Mchs)	
	1920	1921	1920	1921	1920	1921
January	25,057	6,485	29,283	3,185	93	93
February	25,505	9,986	43,719	7,507	99	99
March	29,326	16,378	57,273	9,778	74	74
April	17,147	20,000*	64,634	13,800*	1,134	1,134

\*Partly estimated.

## Specifications Chosen for Ideal Highway Section

An agreement on the general construction of the ideal section of the Lincoln Highway has finally been reached by the Technical Committee of highway experts, appointed by the Lincoln Highway Association. Although the location has not been made public, it was agreed that the ideal section should be located so as to be easy of access and where it would carry a representative traffic for coming years.

It was voted to predicate the specifications upon an average traffic of 15,000 passenger cars, traveling at 35 m.p.h. and 5000 motor trucks, traveling at 10 m.p.h., per 24 hr. day.

As to the general specifications, the committee agreed upon a minimum right of way of 100 ft. The road itself will have 40 ft. of concrete paving, with reinforcing steel embedded, 10 in. thick and laid in one continuous slab without central sub division. The ideal section will be drained by catch basins and submerged tile under the earth shoulders. There will be no curves of a radius of less than 1000 ft. A right-of-way of 25 ft. on either edge of the road will be turned over to a landscape gardener for beautification. Work on the highway will begin shortly.

## Association Urges Highway Appropriation

That Congress pass the Federal aid appropriation of \$100,000,000 for road building was urged in resolutions adopted by the Asphalt Association at its second annual convention in New York, April 13.

President Joseph B. Draney, in his annual address, predicted that unless reactionary pessimism grips the country, 700,000 men will be needed in the building of 35,000 miles of new highway contemplated this year under the billion dollar road program outlined by the Federal government and the states and counties. "Stimulation in the production of trucks, machinery and raw materials and in engineering and the employment of labor can positively be accomplished with an untrammelled road-building program," said Mr. Draney.

## New Members on Highway Council

S. M. Williams, Chairman of the Federal Highway Council, announces the election of four new members to the Executive Committee of the Council: W. J. L. Banham, general traffic manager, Otis Elevator Co.; David Beecroft, president S. A. E. and directing editor Class Journal Co.; Col. H. W. Alden, vice-president Timken-Detroit Axle Co. and S. P. Leeds, president, Atlantic City Chamber of Commerce.

Mr. Williams states that the selection of these men is in recognition of their interest and activities in the work of the Federal Highway Council, and the determination to place the work upon the broadest lines and under the direction of men of the widest experience.

# NEW COMMERCIAL CARS



## J. G. Brill Co.'s New Railroad Omnibus Departs From Conventional Design

**K**NOWLEDGE of existing conditions in the transportation field, such as maintenance and operating costs for operating main or branch lines where travel is moderate, increasing demand by residents in rural districts for transportation service and the need for a conveyance that will render a simple and inexpensive means of transportation, prompted the J. G. Brill Co., Phila., Pa., to embark in this field with its new railroad motor omnibus. This new job is, primarily, intended for operation on stream railroad lines where the cost of operation is almost prohibitive in view of traffic requirements. It is reported that the cost of operating this omnibus is less than \$.20 per mile, this being an estimate based on actual performance and includes the labor cost of retaining one man who acts both as motorman and conductor.

The coach is 22 ft. long, 8 ft. high and, with the chassis, weighs six tons. Its

equipment is like that of a regular street car and is heated from the engine exhaust.

The four-wheel pony truck under the forward end, which is one of the most pronounced features in the construction of this job, is stated to make for steadier and more comfortable riding action, particularly around curves, than is possible with the conventional front axle and wheel assembly. This is obtained by a construction which permits of sufficient lateral movement to provide easement where necessary. It has also been proved that the pony truck adheres better to the rails under a high rate of speed and prevents derailments. This truck can be constructed for any tract gage, it being obtainable in a gage as narrow as 3 ft. 3 $\frac{3}{8}$  in., or as wide as 5 ft. 2 $\frac{1}{2}$  in.

In addition to the brakes on the rear wheels a system of brake rigging may also be installed on this pony truck for applying the brake shoes to the wheels. It is possible to carry a large percentage

of overload on chassis in rail service without injury, due to the fact that the road shocks are eliminated.

The body is constructed in accordance to regular omnibus practice, or will be designed in accordance to the desires of the purchaser.

Additional carrying capacity may be obtained by the use of trailers on which passengers, freight or baggage may be carried as desired. The size of the trailer depends upon the grades to be encountered as well as the capacity of the motor bus. However, on the average American grades the load on the trailer may equal that on the front bus without materially decreasing the speed of the latter. Also with the use of semi-trailers it is possible to increase the carrying capacity of a single unit to that of a railroad coach.

### Mule Sees Its Waterloo

There are more than 5,000 mules for sale in St. Louis and Kansas City, Missouri's two greatest mule markets, where rent and feed are expensive. The mules have been virtually "eating their heads off" since last July. They are a drug on the market, and the dealers owning them have been waiting for buyers, but can't even get a bid. The stagnation in the trade in mules is almost without precedent. However, it shows that the farmers are beginning to realize that upkeep is a most important question, and the cost of feeding any mule, whether he is employed or idle, is not relished by any farmer with an eye to profits.

The hay and grain-eating mule is an expense that efficient farming must eliminate, and the great number of mules offered for sale, and the lack of buyers, show that the farmers are realizing the economies and efficiency accomplished for them by the motor truck.



Front Interior View, Showing Commodious Seating Arrangement. The Interior is Patterned Largely Along the Lines of a Modern Street Car.



New Brill Railroad Omnibus With Trailer. Note the Four-Wheel Pony Truck Under the Front End



## Calumet All-Purpose Truck Body

**A**HINGED side board is the main feature of the Calumet all-purpose body, which is being marketed by the Calumet Truck Body Corp., Calumet, Mich., builders and designers of truck bodies and cabs. This hinge device permits the placing of the side boards of the Calumet body in three different positions. The design of this body was based on the results obtained from an exhaustive investigation covering the hauling conditions existing in all lines of activity. The hauling requirements of manufacturer, wholesaler, retailer, agriculturist and city hauler were studied, in order to determine the exact relation and how much similarity the different hauling requirements bore to each other. It was decided that all of the above lines had need for a box type body

of designing a body that would fulfill all hauling needs.

The conventional method of securing a capacity load is to put a flareboard on the top of the box so that the load could be spread out over a wider area and pyramided to the center of the vehicle. The Calumet method flares the sides direct from the floor of the platform. It is pointed out that this departure from general practice enables the load to ride one-third lower.

Incidentally this style of body is also very adaptable to farm service, as the farmer has occasion to use trucks equipped with inclined sides for many purposes.

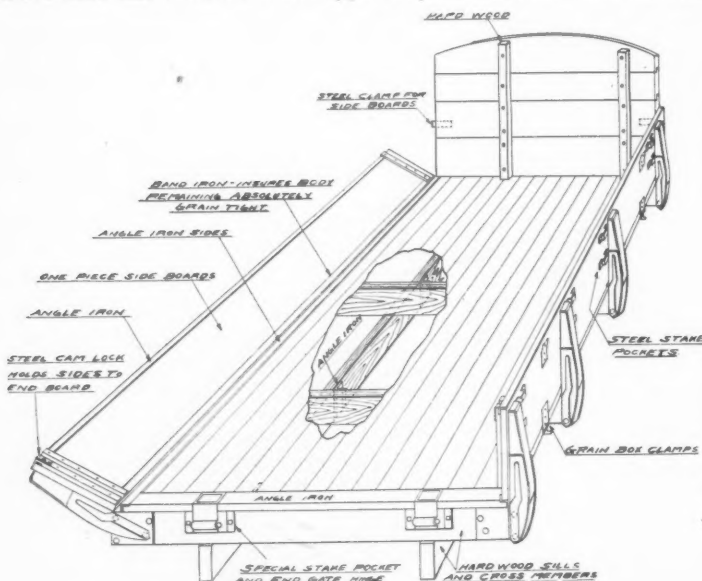
This body serves the user for practically all manner of hauling. It can be converted into the following nine styles:

Single box, extension box, incline deck, flat deck, stake, incline stake, rack, express, and cattle rack.

The stake body is conventional in appearance and the panels are mounted on the hinges the same as the side boards with the result that the panels can be removed with ease in any weather, wet or dry; there being no chance of swelling as the mountings are all steel.

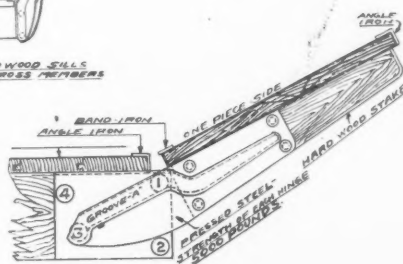
Conversions from one type of body to another are quickly made, as the patented adjustable pressed steel hinges are easily adjusted, it being simply necessary to lift a side board and letting it drop into any of three positions. In fact, the entire side can be lifted out of the way if desired, to facilitate loading or unloading.

The body is built of Michigan hardwood well reinforced with angle and strap irons. The hinges are all of pressed steel. The deck length of the body is approximately 8 ft. long and 55 in. wide. The sides measure from 14 to 45 in., and the stakes, 28 in.



Left: General Sketch, Showing Assembly of the Calumet All-Purpose Body.

Below: Showing the Construction and Assembly of Calumet Hinge



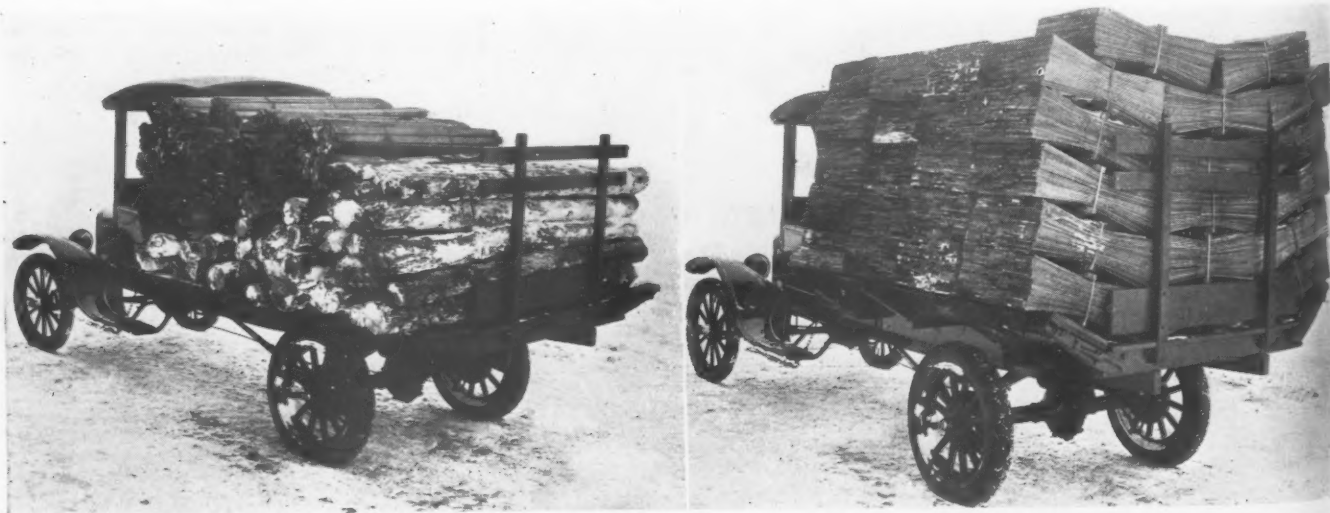
at certain times, yet there were also times when it was necessary to carry capacity loads long distances, in which cases a wider platform was absolutely essential in order to carry a full capacity load. As a result of these discoveries this company delegated its engineers to the task

## Simplex Standardized Bodies

Simplex standardized bodies, the latest addition to the line of the Simplex Mfg. Co., Conneautville, Pa., were built in response to the insistent demand by the company's distributors for a combination body of this type. It is said that the low price of these bodies is made possible because of the lumber interests controlled by this company. All lumber used is supplied direct, and the processes through which the lumber must pass before being finally used is said to be advanced and modern method.

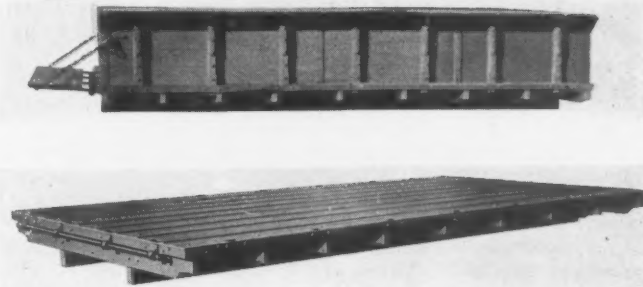
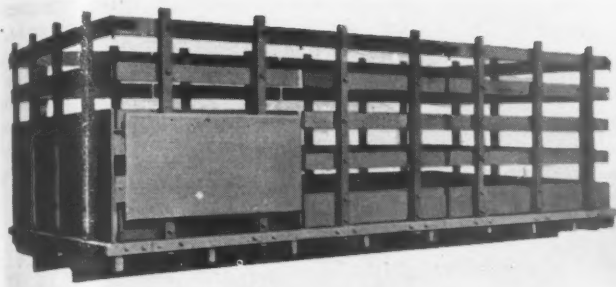
This body can be readily converted from the plain platform body into either a stake or panel in a comparatively short time. The side parts are constructed in sections in order to facilitate rapid changes.

The platform which forms the base upon which the different styles of Simplex bodies are constructed is built in 10, 12, 14 and 16 ft. lengths, and 5, 5½, 6, 6½ and 7 ft. widths. The construction of the platform is sturdy and is adjustable to fit any width chassis frame. As may be observed from one of the accompanying illustrations, the number of cross-mem-



Two Views, Showing the Same Body Adjusted for Different Types of Loads. Note the Flat and Inclined Decks





Three Views of the Simplex Standardized Body

It can be readily converted from a platform body into either a stake or panel body in a comparatively short time. The sides are constructed in sections

bers employed in order to secure a durable over-size construction exceed the number used in general practice. Pressed steel pockets are used and wear strips when used, this equipment being optional, are bolted to the floor.

The stake sections are 48 in. high and are standardized so that they will fit any

platform. When they are all arranged in place, the result is a popular form of stake body. The sign-board is optional.

The panel sides which are also in removable sections are 17 in. high, and have 9-in. 45 deg. flare-boards. These sides and tail gate are said to fit on any platform satisfactorily.

which they are provided, take up but eight inches of space.

As may be observed from the accompanying illustrations, the construction of the body is such as to permit loading and unloading from the front without the necessity of disturbing the curtains in bad weather and exposing the contents of the car to the damaging effects of inclement weather.

An increased loading space of about 50 per cent and the fact that the load is placed where the car will carry it to best advantage, with less power and minimum wear on the engine, are pointed as important features of this job.

The bodies, of which there is a variety of styles, are all strongly built and well braced. A general idea as to the construction of these bodies may be had from the following brief outline of the No. 600 model express top delivery body. This body has a divided seat for one or two persons, either or both halves of which are removable for easy loading. The side and rear curtains are of heavy rubber duck. Large celluloid windows are provided in the side curtains at each side of the driver's seat. The length overall is 8 ft. 6 in.; inside length, 5 ft. 3 in.; width, 3 ft. 4 in.; height, 4 ft. 6 in. The tail-gate is the drop type.

## Waterloo Delivery Body Has Novel Feature

**B**Y reason of an ingenious arrangement, which involves the locating of the gas tank at the left of the driver's seat where it conforms with the contour of the body, articles as long as eight feet can be transported with facility in the new Waterloo delivery body recently introduced by the Waterloo Body Corp., Waterloo, N. Y. This side fuel tank feature is incorporated in every style of body for mounting on a Ford Model T chassis, manufactured by this company, such as the panel delivery, express top delivery, plain express, etc., in addition to larger and heavier bodies built along the same general lines for use on Ford one-ton truck.

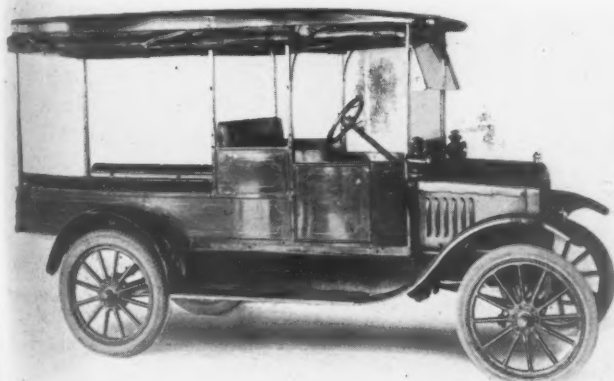
Not only is an invaluable section of loading space made available by placing the fuel tank at the side, which by so doing has not reduced its capacity, it carrying sufficient gasoline for ordinary use, but it is said to give the whole body a neat and finished appearance and adds to the comfort of the driver for at least a portion of the year. This arrangement allows the use of a single seat for the driver, which is so constructed that it can be instantly removed if it is desired, and permit of the carrying of packages

at least eight feet long inside of tail gate.

The driver's seat can be used for one or two persons and can be removed or replaced in a moment. The extra seats are also designed to permit of rapid removal and the folding lazy backs, with



Above: Illustrating the New Side Fuel Tank and Folding Seat Features Incorporated in Several Waterloo Bodies



Left: Model 600 Waterloo Express Top Delivery Body With Side Tank.

## Hayes Introduces New All-Weather Metal Cab

The problem of providing for the driver's comfort is being given more and more attention by motor truck operators who realize that, to obtain the best efficiency in operation, they must take care of the driver and make him comfortable. The truck cab built by the Hayes Manufacturing Co., Detroit, Mich., was designed with a view to filling this need.

This cab is equipped with sliding win-



Hayes' New All-Weather Truck Cab

dows which may be closed readily, sliding doors, and ventilating windshield. With these features, the driver has, on a hot day, all of the advantages of the open cab. In case of a sudden storm, however, or in continued bad weather, he has, in an instant's time, an enclosed cab, giving him absolute protection.

The cab is built of steel. This is of decided advantage in that it gives the greatest possible durability and, consequently, very nearly eliminates the item of maintenance expense. Its makers have no hesitancy in stating that it will last the life of the truck.

Building of steel also makes possible a reduction of pillars to a minimum cross-section, thus increasing the driver's field of vision and promoting safety in traffic. This solid and compact steel construction also does away with the annoyance of rumbles and rattles.

The cab is produced as a standard in three different widths seating two and three persons, and can be with very slight modifications adapted to any of the standard makes of truck chassis. It is equally suitable for mounting on a new chassis or for replacing worn-out equipment on older trucks.

## Heil Welded Gravity Dump Bodies for Contractor Use

**T**HE Heil Co., Milwaukee, Wis., well-known dump body and tank builders, quite recently announced a newly designed welded gravity dump body, with which it is at present in quantity production. This body is especially intended for contractor service in connection with concrete road construction work, but it is said to be equally adaptable to other types of service, such as hauling coal, earth, gravel, sand and other building materials. These bodies incorporate several new features in dump body construction and are produced in various sizes, ranging from  $\frac{3}{4}$  yd. to  $1\frac{1}{2}$  yd. capacity for mounting on trucks ranging from  $\frac{3}{4}$  to 2 tons or more. One-yard bodies weigh 410 lb. and sell for an even \$100. Dual hoppers are employed instead of the single bodies in the case of large trucks.

As these bodies are welded throughout by the electric process, no rivets being used anywhere, an absolute water tight construction is said to be secured, which is an important requisite in the handling of wet concrete.

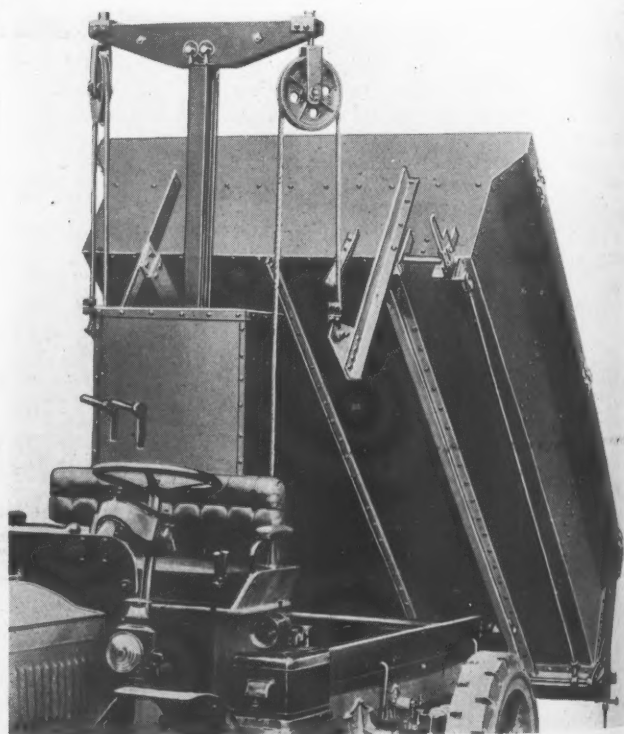
A big improvement also has been secured in the simplification of the operating device through the elimination of as many as fifty parts in the assembly of this piece of mechanism. First of all the body tips or rolls over on pivots, which prevent it from getting out of alignment, and, instead of using control chains, two bars or rods are attached to a cross member which connects the longitudinal parts



**Above: Body Tipped for Discharge.**

Note the new construction; the control rods.

**Right: New Type Archer Hoist Attached to a Packard Truck.**



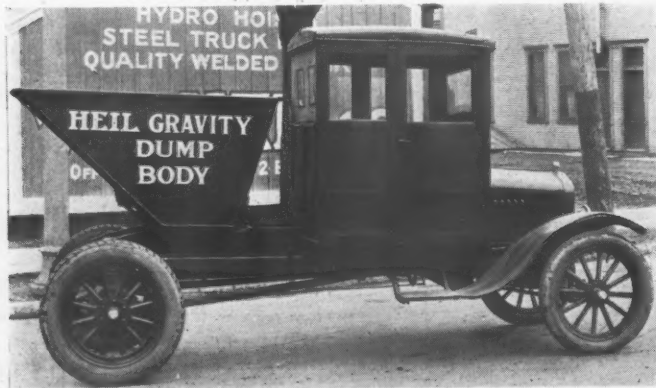
to the sub-frame, note the accompanying illustration. Two coil springs are carried by the rods, which keep the body firmly in place when in the raised position. These springs also permit the body to roll over easily when loaded and prevent it from rattling when empty. The dumping angle is approximately 60 deg.

### New Archer Power Hoist

A recent announcement discloses that the Archer Iron Works, 34th Place & Western Ave., Chicago, Ill., has introduced a new type hoist in two capacities for light and heavy-duty. The light-duty hoist is intended to be used in connection with trucks of from one to three and a half tons capacity; the heavy-duty hoist to be assembled to trucks of from three and a half to seven tons capacity. Its design is such as to permit its attachment to any make truck.

One of its features is said to be its simplicity in construction, which is claimed to materially reduce the possibility of disorder. Its action is said to be both simple and positive, and is claimed to raise the body quickly to the dumping angle without subjecting the engine to severe strain or needlessly racing it.

The Archer hoist is made throughout of steel of a strength and size making for a wide margin of safety. The maker points out that its construction permits locking it any position even with full load. No upkeep cost for its entire life, which is said to be longer than that of the truck on which it is mounted, is guaranteed. This eliminates lost time, incident to hoist repairs, or packings to be replaced. The simple mechanism makes this hoist fool-proof, permitting even the most inexperienced to operate it without danger of harm.



**Latest Heil Product, a Welded Gravity Dump Body**



# TRUCK EQUIPMENT AND APPLIANCES



## "J-E" Battery Contains Jelly Electrolyte

Although the J. E. Battery, put out by the J. E. Battery Co., with headquarters in the Knickerbocker Bldg., 152 West 42nd St., New York City, and factory at 1113 S. Broad St., Philadelphia, adheres to the standard principles of battery construction, it has one marked deviation from the conventional, in that it employs Jelly-Electrolyte instead of the usual liquid electrolyte.

The manufacturer claims that the features of this new form of electrolyte is non-spillable, non-sulphatable and non-freezable. The maker also points out that it requires no filling or refilling with distilled water and that the terminals do not corrode and are capable of withstanding severe treatment. Also that it cannot be injured by



### "J-E" Storage Batteries

One of the features of this battery is that it has a chemicalized jelly electrolyte instead of the usual liquid electrolyte

buckling of plates on heavy discharges; not harmed if left discharged for lengthy periods; no need to limit the discharge to a certain voltage per cell and is unnecessary to take it apart and wash the plates if left unused for a long time. At a discharge of 300 amp. it is said to give 18 per cent greater efficiency. Changes of temperature or humidity are claimed not to affect the battery. Battery expenses are said to be greatly reduced and as many of the battery troubles are said to be eliminated it does not require frequent attention. This battery is recharged the same as any lead plate battery.

## Warner Gear Brings Out New 5 to 7½-Ton Truck Transmission

The Warner Gear Co., Muncie, Ind., has just brought a new design heavy duty truck transmission for 5 to 7½-ton capacity trucks.

The new model T62 is a four speed amidships design, with three-point mounting from cross members of the frame. It is designed throughout to meet severe conditions of heavy truck service. The speed reductions have purposely been placed as low as possible to give addi-

tional truck ability. First speed reduction is 5.849 to 1; second, 3.226 to 1; third 1.752 to 1; fourth is direct.

All gears and shafts are of alloy steel. Gear faces vary in width from 1½ in. in the heavily loaded reduction to 1¼ in. in the constant mesh. The countershaft low speed gear is integral with the shaft. In all cases where necessary "through" shifts are made by the sliding gears to give all available working surface of the tooth face.

Annular bearing mountings are used throughout except for the main shaft and pilot end, which mounts on a long type of Hyatt. The oil fling type of oil retainer is used at the main shaft rear instead of packing, thus avoiding necessity of repacking.

No fore and aft thrusts are taken through gear box, as bearings at front and rear, respectively, take all thrusts.

The housing is of cast iron and oil filler plug, tire pump mounting opening and power take off openings are provided.

The total weight is 260 lb.

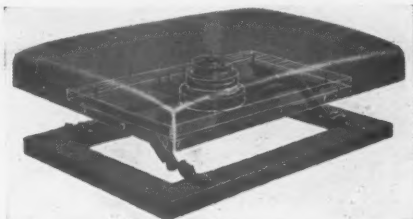
## Truxseet

A seat that makes for greater comfort for the driver and protects his physical and nervous system against the racking effects of vibration and jar of which no truck is entirely free, was recently announced by the Seric Manufacturing Co., 1305 Fifteenth St., Racine, Wis. This seat is known as the Seric Truxseet.

Shock is absorbed through a strong adjustable coil spring. The rods which connect the coil spring and the hooks that are shrunk to the torsion rods are made of steel. The manner in which the shock is absorbed is simple. The coil spring takes the first shock, which is further reduced and absorbed when the shock is communicated through the steel rods to the hooks and links.

There is claimed to be no creep or side sway in this seat, or weakening through use. The driver's weight is distributed over the whole area of the seat. Adjustments for driver's weighing of from 150 to 250 lb. can be instantly made by turning a nut on the spring coil.

These seats are also provided with backs if desired. Prices and additional information will be furnished by the manufacturer on request.



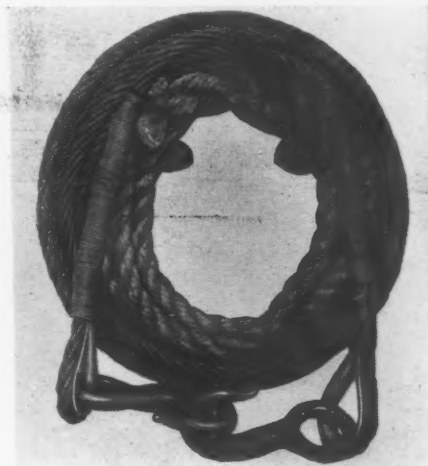
Complete Truxseet Assembly Without Lazyback

Note spring construction in phantom

## Crescent Tow Line

The George C. Moon Co., Garwood, N. J., manufacturers of wire and wire rope, is marketing an item of equipment that should have its place in every tool kit. It is the Crescent tow line, and comes in a convenient canvas bag and occupies but a very small place. This line is strongly made and is claimed to stand up successfully against the severe service in the field for which it was designed.

The accompanying illustration shows one of these tow lines. With every or-



### Crescent Tow Line

Designed for Truck Service and furnished with a canvas bag

der of six or more lines, one line is supplied, mounted on a handsome display board.

The price, complete, is \$6 each, east of the Mississippi, and \$6.75 each west of the Mississippi, shipped by parcel post prepaid. The price, complete, for trucks of large size is \$15 each east of the Mississippi, and \$16.50 each west of the Mississippi. Liberal discounts are extended on orders for six or more lines.

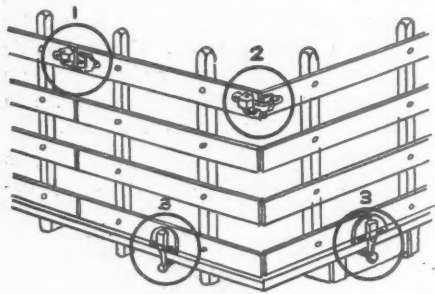
## New Universal Joint Lubricant

A new Dixon lubricant, known as Grease No. 672, was recently put on the market. It is a new development and is an exclusive universal joint lubricant and is being manufactured by the Jos. Dixon Crucible Co., Jersey City, N. J. It is a spongy grease of medium density that is said to retain its normal plastic consistency under a wide range of temperature and climatic changes. It clings to the joint regardless of speed and without loss of its lubricating qualities.



## Reese Grip-Lok Fastenings for Stake Bodies

The need for an effective fastener for truck stake bodies has ever been a need of owners operating trucks equipped with stake bodies. The conventional type of fastener always has been a more or less source of annoyance in that it fails to satisfactorily perform the services for which it was designed. Until recently loose side and end gates, rattling, etc., had to be tolerated, as up to that time nothing had been introduced on the market to serve as a more fitting substitute.

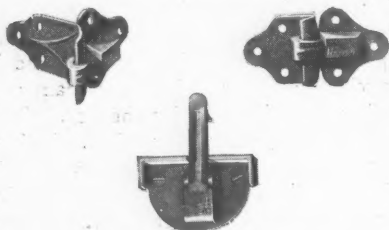


Showing Application of the Three Types of Reese Fasteners

The latest stake body fastening device, however, meets successfully all the requirements demanded of it.

Briefly, Reese Grip Lok hardware, for truck stake bodies, introduced by the Reese Manufacturing Co., Detroit, Mich., have the following meritorious features of construction and service: Saves time and labor, prevents pounding and rattling, both fastens and locks, locks gates instantly, maintains the body in alignment, permits the removal of each gate independent of the other and is of strong construction and neat appearance.

Grip Lok hardware consists of three separate types of stake body fasteners—one for side gates, one for corners and one that locks side or end gates down on the truck bed. Each is a complete unit in itself, operating independently. One of the distinctive features in construction, which is incorporated in all three types, is a compensating cushion spring, so encased in the housing that it cannot work loose or come out. It exerts a constant tension, holding gates and ends securely and rigidly in place and automatically takes up all side or end play. The bottom fastener, because of the very nature of the service it must perform, varies slightly in construction, fundamentally it is the same. It has, in addition, a cam hook lever, a simple movement of which, up or down, unlocks or locks the gate to the bed of the body.



Reese Grip-Lok Fasteners  
Left, Corner; Right, Side; Below, Bottom

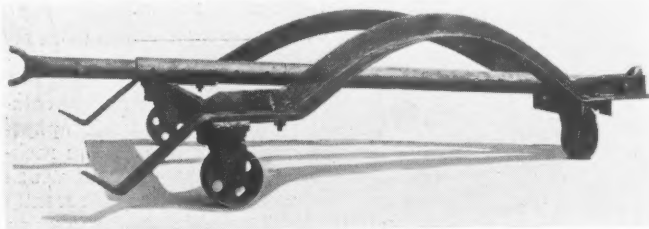
These fasteners are so designed that the wood sections of the gates, corners or sides cannot come in contact with each other, and all the wear falls directly on the metal parts, thereby preventing strain or damage to the wood portions of the body. Malleable iron is used in the construction of these fasteners, and the reinforced metal design and symmetrical modeling lends much to the attractive appearance of a stake body equipped with these fasteners.

The maker claims that these locks permit all gate sections of stake bodies to be instantly put in place and as quickly removed. The gates are lifted easily in or out of position and a simple throw of the cam lever locks or unlocks the gates at will.

## Ford Unloading Truck

The Will-Burt Co., Orrville, O., recently perfected a truck that facilitates and reduces the labor of unloading Ford chassis from box cars.

The task of unloading Ford chassis from box cars is a difficult one. Stripped Ford chassis when shipped from the factory are arranged in box cars so that the front axle rests on the floor and the rear axle lies against the side, close to the roof.



Close-up of the Will-Burt Special Ford Unloading Truck

The Will-Burt truck is constructed of angle iron and is "V" shaped. The front or wide end is provided with two flat steel supports, pointed and slightly turned up at the ends for carrying and supporting the front axle of the Ford. The rear or point end is provided with an adjustable post, which consists of two telescoping tubes in which are drilled a number of holes. Any required length of the post may be secured by inserting a pin into the registering holes of the tubes. The truck is mounted on three ball-bearing swivel casters equipped with 4-in. wheels.

In operation the truck is wheeled underneath the chassis with the post collapsed. The rear or point end is then raised up and the two supporting arms slipped under the front axle of the Ford after which the rear end is pushed down, which raises

the front axle a few inches above the floor. The rear axle of the Ford is then raised sufficiently to clear the side of the box car. At the same time the fork of the post, which is adjusted to the required length, is slipped under the transmission shaft at a point immediately in front of the differential housing. This completes the loading. The chassis is mounted on the truck in practically the same position it had while in transit.

The truck is then rolled sideways to the door of the box car and shoved out on the platform. When unloading a plank is slipped underneath the chassis between the drain plug of the crankcase and the curved hump of the truck, placing the chassis almost on a balance. The rear axle then is slightly raised, enabling the removal of the post from out of the chassis' way. The rear axle is then let down on two trestles. Simultaneous with the lowering of the rear axle the front axle leaves the supporting arms of the truck, the entire chassis still being balanced on the curve of the truck, thus both axles are sufficiently clear of the floor to permit the slipping on of the wheels. After the wheels are assembled the plank is knocked out of place and the truck is rolled out.

The curved side members of the frame of the truck serve two purposes: first, to clear the front axle of the chassis adjoining the one which is being loaded on the truck, and, second, to act as a fulcrum, thus permitting the suspension of the front axle above the ground when the rear axle is lowered on the trestle.

These trucks are constructed of metal throughout and sell to Ford dealers at \$22.50.

The Michigan Pikes Association will hold its sixth annual "Pikes" tour the second week in July. Passenger cars and trucks totaling 80 are to be used.



Unloading a Freight Car of Ford Chassis With a Will-Burt Truck

### Ideal Hood Lock No. 83

The Ideal Brass Works, Indianapolis, Ind., recently introduced a new hood lock in which it has effectively incorporated desirable features of service, symmetry of design and beauty of appearance. It is known as the Ideal Hood Lock No. 83, and its most prominent features are those of automatic lubrication and increased bearing surface.

This hood lock is of the eccentric type which permits the lock to be operated with but one finger and which also per-



**Ideal Hood Lock No. 83**

This Hood Lock is claimed to positively prevent hood rattling.

mits the employment of a much stronger spring. The eccentric locking element is associated with the hood catch in such manner as to secure a two-point bearing, a feature which is claimed to prevent side motion and rattling.

The hood lock is adjusted by rotating the body on the anchor bolt which operation lengthens or shortens the lock as desired. The lock body carries an absorbent pad which contains sufficient oil for lubricating all moving parts. Each time the lock is released the anchor bolt automatically is forced into engagement with the absorbent pad, which lubricates the moving parts. It sells at \$1.25.

### Foley Friction Rim for All Size Wheels

A complete line of traction rims are now being manufactured by the Foley Traction Rim Company, of 1311 Hennepin Ave., Minneapolis, Minn. These may be quickly attached or detached to the traction wheels of motor trucks and tractors regardless of the make or type of truck wheel. The line includes traction rims for wheels using a 32 x 4½ in. and 33 x 5 in. pneumatic tires (which are intended for Ford truck rear wheels using pneumatic tires), also the 35 x 5 in. pneumatic tire rim and traction rims of different designs and types for use on truck wheels with solid rubber tires.

The standard type of rim is made so that the width conforms with the size tire on wheel. For instance, the 32 in. size rim is 2¾ in. wide overall and the 36 in. size rims is 3½ in. wide overall.

Special rims are also made in various widths up to and including 8 in. wide and are of double reinforced construction, made up from a combination of electric steel casting and boiler plate steel. The latter rim is designed in particular for the heavy duty trucks engaged in road building and other similar work having to negotiate unusual road conditions.

### Cylinder Compression Gage

The Cylinder Compression Gauge, manufactured by the Star Device Mfg. Co., 2201-03 Second St., Seattle, Wash., is for testing and determining the causes of poor compression. For making test the device is screwed into the spark plug hole.

In testing for leaking rings a test is first made on the cylinder in question and the reading noted, the gage is then removed and some heavy cylinder oil placed on top of the piston, which seals the rings temporarily; a second reading is then taken and the difference represents the loss caused by leakage around the rings; this is a good and quick method of determining if the loss of compression is due to the rings or valves.



**Star Cylinder Compression Gage**

For testing compression of each cylinder of an engine

The piston is provided with a graduated stem, which reads in pounds from 20 to 100.

This company also makes gages with either ½ in. standard pipe size or ¾ A. L. A. M. threads, also a full line of adapters to be used on machines that do not permit the gage to be screwed directly into the spark plug hole.

### Haskelite

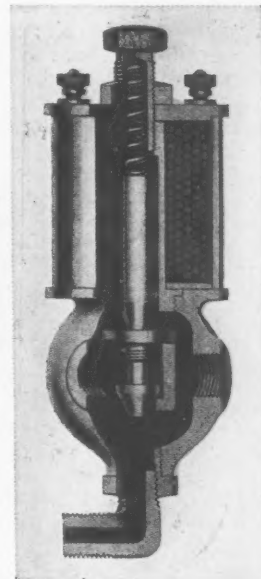
Haskelite is a mouldable waterproof plywood which is stated to be stronger than steel per unit of weight. It is the product of the Haskelite Mfg. Corp., Chamber of Commerce Bldg., Chicago, Ill. The rough usage and abuse that can be given it without permanent injury is the basis of the claim of its superiority over wood. Due to its cross graining and the use of genuine insoluble waterproof glue, it is given uniform strength and permits it to be boiled and moulded into roofs for tops.

Nails or screws can be driven very close to its edge without causing it to split, and screws cannot work loose from spreading. On account of its water-resisting qualities the plies will not separate, and it may be boiled so as to soften the fibers and then bent into various shapes, similar to a horseshoe, magnet and the like. When so shaped it retains this form permanently. Its light weight is another important feature. Many body builders are using Haskelite for roofs of closed bodies of cars, truck cab roofs, sides of commercial bodies, dash boards, instrument boards and door linings.

### Automatic Oxidizer

A new device, designed to affect a saving of gasoline, give greater power and to eliminate carbon, has recently been announced by the Automatic Oxidizer Co., 309 Hartman Bldg., Columbus, Ohio.

It is intended to increase the proportion of oxygen in the gas and thereby obtain complete combustion. The method used to increase the proportion of oxygen is by



**Automatic Oxidizer**

Showing the interior mechanism. It consists essentially of a compound valve structure and a solenoid coil.

means of the process of disturbance and the diffusion of the water vapor.

This device operates automatically, and requires no attention from the driver.

A compound valve structure combined with a Solenoid coil, automatically controls the operation of the valves. This is done with the current coming from the magneto or generator, and does not permit the oxidizer to operate until a certain speed of the engine is attained. The connection for the vapor tube line is at the bottom. One of the large openings (the one penetrating the inner valve compartment) is threaded to receive a special fitting for connecting a ¾-in. copper tubing. This large tubing carries the mixture to the special carburetor plate, and the other large threaded valve opening is left open.

The carburetor plate is constructed of metal and designed to admit the mixture into the inflowing gases at right angles and at a greater velocity, accomplished as follows: The turning over of the engine tends to create a vacuum in the manifold, and the large ¾-in. tubing being very short, gives practically no resistance to air passage up to a point where the same enters the manifold chamber. Just at the point of entrance there is a specially designed small opening, through which the mixture flows with greater velocity. None of the mixture is released for passage until sufficient current has been generated to open the valves in the main structure. Two strands of insulated wire are supplied, already joined and soldered to the coil of the oxidizer for connection to the electrical system.



## Latest Turmo Engine Specially Built for Truck Service

**T**HE latest addition to the Turmo line of engines, put out by the Turner & Moore Mfg. Co., Detroit, Mich., is the Model "H," which has a bore and stroke of  $3\frac{3}{4} \times 5$  in., respectively. Offered specially for truck service it is designed to stand up against the gaff of severe service and accomplish the greatest amount of work with the least expense.

A special mixture of semi-steel high grade cast iron is used in the four cylin-

concave slot through which this clamp bolt passes is further assurance against the pins working against the cylinder walls.

The connecting rods, which are of "I" beam section, are of .40 carbon drop-forged steel, heat-treated.

The camshaft is  $1\frac{1}{4}$  in. in diam. with cams forged integral. It is supported in three main bearings which are lubricated under pressure. The camshaft and tappets are carried in a tunnel in the crankcase and are constantly submerged in oil.

The crankshaft, which is of .40 carbon steel, heat-treated, rotates in three liberal size bearings. Oil lead holes are drilled from the three main bearings to the connecting rod bearings. The center bearing is provided with flanges which take up the end play.

The crankcase is a gray iron casting and is split  $3\frac{3}{8}$  in. below the center line of the crankshaft. Crankshaft bearing and pins are easily accessible when the oil pan is removed. This pan is heavy

pressed steel with reinforcing flange around the top.

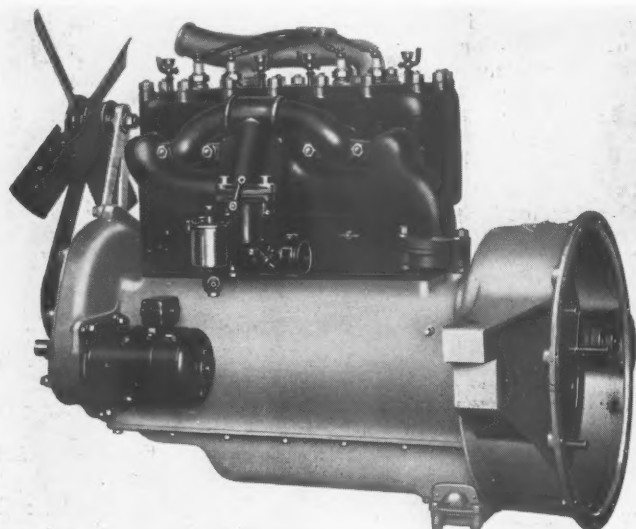
Bolted to the rear end of the crankcase is the flywheel housing, which is separate gray iron casting and is machined for a No. 3 S. A. E. standard transmission. However, a rear end mounting bracket to replace the flywheel housing can be obtained, if desired. The rear support arms are No. 2 S. A. E. truck standard.

Helical timing gears are used and run in streams of oil from the camshaft tunnel overflow and from the oil pressure relief valve. The crankshaft and generator gears are steel forgings and the camshaft gear is of special alloy.

The three camshaft bearings are hardened ground steel running in cast steel. The crankshaft bearings are of nickel babbitt. The connecting rod or crank pin bearings are bronze back babbitt lined. Laminated shims are provided for easy adjustment of crank and connecting rod bearings.

The intake and exhaust manifolds are in one casting. A small area of the intake passage is heated by the exhaust gases. This construction is said to assure complete vaporization as any condensed fuel which may come into contact with this hot area is immediately vaporized and remixed with the air. The intake manifold is machined for a  $1\frac{1}{2}$ -in. carburetor.

The flywheel is a semi-steel casting of ample size and is attached to the flange

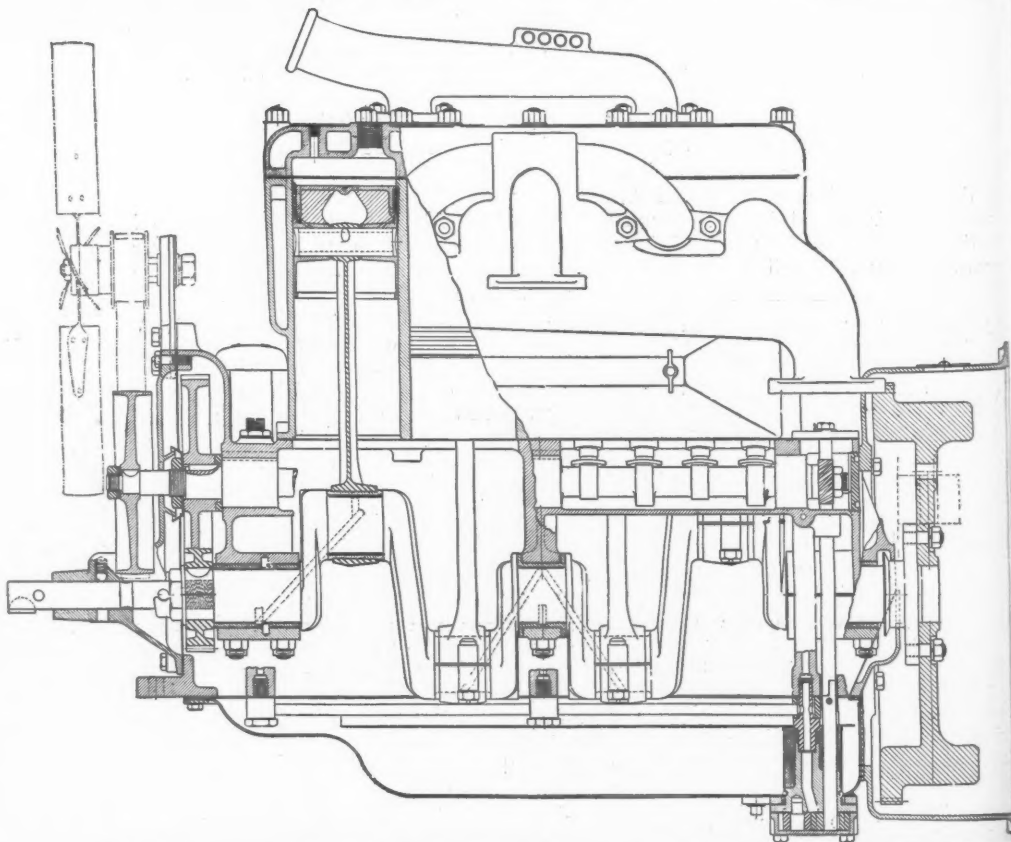


Left Side of the Model H Turmo Engine

Note clean-cut lines throughout and assembly of manifolds

ders which are cast in block. Ample water space is provided and special care was taken to assure proper circulation around the valves. The cylinders are also fitted with removable guide bushings for both tappets and valve stems. Valve adjustment is accomplished through a screw and lock nut arrangement and ready access is afforded to the valves by removing a cover plate. The cylinder head, which has two outlets, is demountable and provides ample water space. The tappets are mushroom type, carbonized, hardened and ground.

The pistons are of semi-steel or special cast iron, full skirt type. An oil collecting groove provided just below the bottom ring is claimed to assure positive oiling of the piston pin at every piston stroke. The piston pins which are tubular steel, carbonized, hardened and ground on the outside, are held stationary in the rods clamping with alloy steel heat-treated bolts. A



Cutaway Sectional View of the Three and Three-quarters by Five-Inch Turmo Engine

of the crankshaft by six large alloy steel studs. The outer rim has 119 teeth for the electric starter pinion.

Cooling is either pump circulation or thermo-siphon, as desired.

The lubrication system is positive full pressure fed to all bearings in the engine, from a gear pump. The oil pump is attached to the bottom of oil pan at the rear. The pump together with the oil screen may be easily removed, and the pump is operated by a vertical shaft

driven by gears from the rear end of the camshaft. The top end of this shaft also drives the distributor when the same is used. Oil is led to the main and connecting rod bearings through tubes and the drilled crankshaft. The camshaft bearings are also lubricated by oil delivered through leads drilled in the crankcase. The cylinder walls are lubricated by oil mist and the piston pins are oiled by special oil grooves in pistons with oil holes leading to the top of piston pins.

Oil pressure is regulated by a relief valve which is located at the front top side of the crankcase. A high-grade oil-level gage is located on the right side of the oil pan.

The following equipment is furnished with each engine: Water inlet, outlet, intake and exhaust manifolds, adjustable fan bracket, fan driving pulley, and magneto bracket of battery ignition mounting, as desired.

The engine weighs 465 lb.

## Erie Power Winches for Motor Trucks

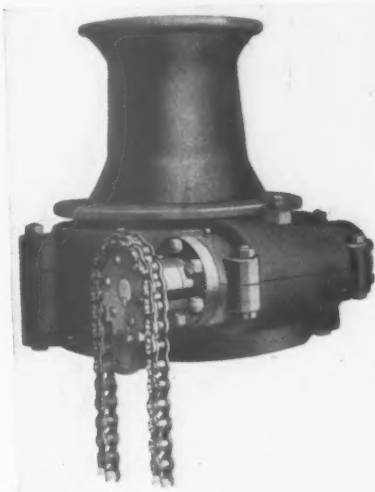
Several new models of power winches have lately been added to the line of the Erie Hoist Co., Erie, Pa. These additions round out the Erie line. The completeness of the line enables the adaptation of its winches to practically any kind of truck service. The present types include the following: 230-A, 225-A, 225-B, 226-B, 226-D, 227-D, 227-E, 227-D-40, 227-F and 228-D.

Model 230-A is a heavy duty Vertical Capstan Winch. One of its features is that pulling can be from any angle, or from the sides of the truck, without the use of sheaves. It is mounted on an I-beam base and requires but little space. The driving sprocket can be placed on the side of the winch, which is most convenient for driving. The worm and worm gear operate in a bath of oil and are protected against dirt by an enclosing housing. The weight is 535 lb.

Another type in which the two nigger heads are close coupled so as to take up the least possible amount of space is known as the model 225-A. It can be readily installed on the chassis or on the platform of the truck in back of the cab and requires no special brackets nor is necessary to drill holes. The worm and worm gear are incased in a dirt proof housing and operate in a constant bath of oil. The weight is 670 lb.

A winch, designed for attachment under the rear end of a truck frame and which is made to fit regardless of the width of the chassis, is the model 226-B. It is an underslung winch, having two nigger heads, which extend just outside of the end bearings. This model leaves the entire body of the truck free for material. The end bearings are bolted to the sides of the truck frame, thereby making the winch rigid and compact. Power is transmitted to this winch by a sprocket and chain arrangement. The drive can be had from either side of the truck. The worm and worm gear is run in a constant bath of oil and enclosed in a dust proof housing. The weight is 675 lb.

A design which is compact and staunchly built for installing on the chassis back of the cab and intended for heavy work, where a large amount of cable is not required, is the model 227-E. The frame on which this winch is mounted brings the drum as low as possible. It, however, can also be obtained mounted on a frame 6 in. high instead of the low frame. This model can be operated by the driver



Heavy-Duty Erie Vertical Capstan Winch, Model 230-A

by making a small adjustment, or it can be operated on a platform of the truck. The drum is driven by a powerful friction clutch, which is on one end of the drum. A ratchet and pawl is on the other end of the drum to lock the head securely. A transmission, which provides three speeds forward and power reverse, can also be had when this model is mounted on a 6-in. frame. The weight complete is 1070 lb.

The model 227-F is of the same construction as 227-D, but has a much larger drum, to be used where it is necessary to hold a considerable amount of cable. This design is especially adapted for service in the oil fields, telephone, telegraph, electric light companies, house movers,

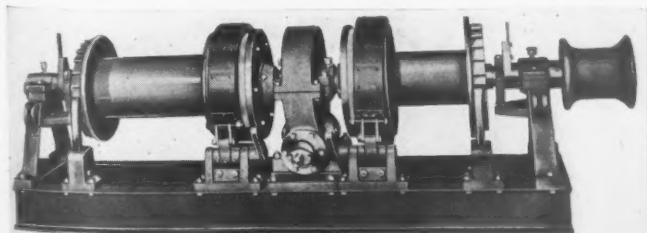
riggers, etc. This winch can be operated from driver's seat or from the platform of the truck. The clutch which drives the drum is of the cone type, with double friction surface and is designed for heavy duty and is easily adjusted to the work it is required to do. This model is mounted on the chassis close to the cab and is fastened to the truck frame with U bolts, or straps bolted to the frame, thereby eliminating the necessity of drilling. If desired this model can be obtained equipped with the three speed and power reverse transmission, which gives three increased speeds or decreased speeds as desired, also offered by this company. The weight is 1300 lb.

A winch, designed especially for construction work, is the double drum winch, having two complete hoisting engines on one frame, with but one drive shaft, known as model 228-D. It can also be used with great economy in the logging service. It is installed immediately back of the cab. One of the drums is a little longer than the other. The small drum rope can be fastened to a boom, which raises and lowers the boom to the desired position and then, locked by the ratchet and pawl, can be held in this position indefinitely with perfect safety. The large drum line is used to handle the load. This winch can also be used for hoisting material into places, as each drum is independent of the other. Each drum is equipped with a band brake and ratchet and pawl. The drums are driven by powerful friction clutches, which are easily adjusted when worn. The worms and worm gear run in a bath of oil in a dirt proof housing. This winch is furnished with one, two or without nigger heads. This winch can also be supplied with the auxiliary transmission. The weight, complete, with one nigger head, 1725 lb.

## Western Plant for United Motor Co.

A factory to assemble and distribute its products on the west coast and in Mexico is to be built by the United Motors Co., of Grand Rapids, Mich., manufacturer of United trucks. The demand for United trucks in this section is the cause of the new plant. The factory at Grand Rapids will continue as before and will supply the territory east of the Rockies. Parts will be made at this plant and shipped to the new factory in car load lots.

M. H. Kanary, president of the United Motors Co., will act as general manager of the western plant and was appointed general manager of the Grand Rapids unit.



Erie Double-Drum Motor Truck Power Winch, Model 228-D.



# Benson Worm Drive Revolutionary

## Mounting and Production Methods Made "Hour Glass" Feasible

**T**HE Benson Gear Company, 105 West Monroe St., Chicago, has developed a new method of mounting worm gears of the "hour glass" type in truck rear axles and also special machinery for producing this type of worm and worm wheel economically. The experimental worms made by this company have had years of testing, which has proven their merit, both of design and mounting. The difficulty, however, up to the present time, has been to devise some method of economically producing them. This has been recently solved by the design of a special machine which cuts both the worm and the wheel, and therefore the use of these worms is now a commercial possibility.

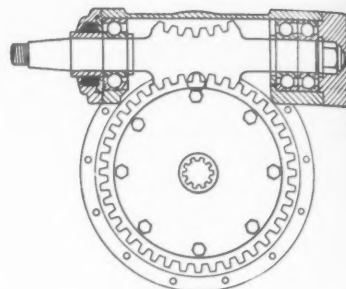
Up to the present time the straight type of worm, as shown at the left in the accompanying line sketch, has been used almost universally because it was the best construction that was commercially available. The Benson worm mounting and cutting machinery now make it possible to use the "hour glass" worm.

The advantages which are conceded by engineers to the "hour glass" type of worm are greater durability, higher efficiency and less heating under heavy load. This is due, primarily, to the lower load on the teeth due to the greater number of teeth in contact at the same time.

One of the great difficulties encountered with the "hour glass" type of worm in the past has been the inability of the user or the manufacturer to accurately locate the worm with respect to the wheel. This defeated the purpose of the design, namely, the distribution of the driving load over a large number of teeth instead of concentrating it practically upon one tooth. By mounting the worm in a carrier enclosed in the rear axle differential housing, but so mounted that

it is movable on trunnions, the axis of which pass through the root line of the worm gear, it is possible to let the "hour glass" type of worm automatically adjust itself if it has not been properly installed. This is a patented feature of the Benson worm and upon this most of the claims are made.

It is claimed that, based upon tests made in England with a properly mounted and well lubricated "hour glass" worm and wheel, it is possible to obtain constant efficiency at all loads and speeds



**Greater Number of Teeth in Mesh With Globoid Gear**

The pressure between the curved worm and gear is distributed over a number of teeth

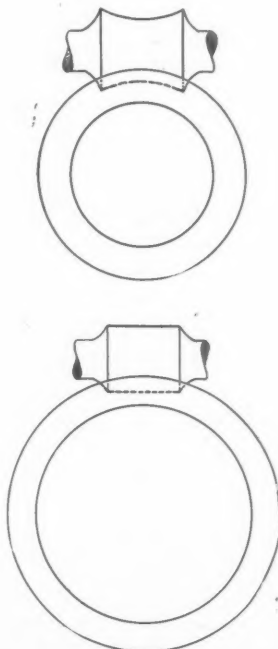
not only upon an experimental but upon practical installations when the worm is mounted upon trunnions.

It is also claimed that the heating of the worm does not occur because the tooth pressure is so low that the lubricant is not pressed out under heavy load. This pressure, due to the greater number of teeth in contact, is less than 10 per cent that of the straight worm, so it is claimed.

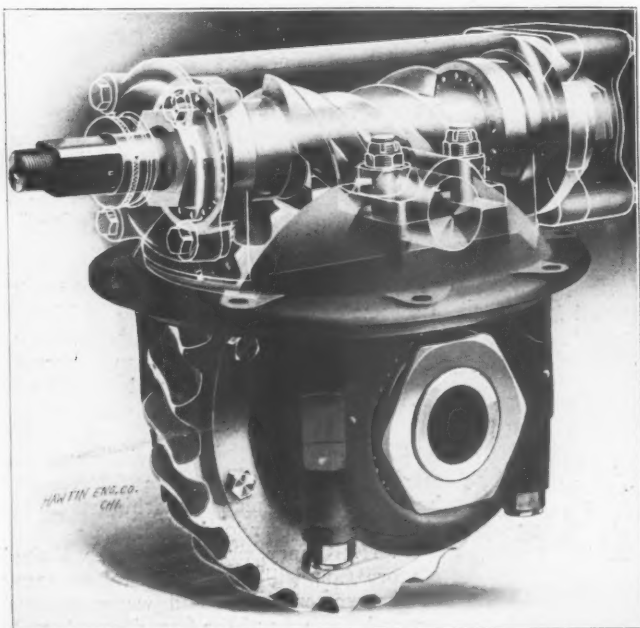
Due to the lower pressure it is possible to use a smaller tooth and thereby reduce the size of the gears necessary for a given truck. That is advantageous in reducing the size of the rear axle housing in the center and thereby increasing the road clearance.

There are two other "hour glass" types of worms in use, the Hindley and the Lanchester. The Benson engineers call attention to the fact that they not only have a different mounting of the worm but on account of their manufacturing methods produce teeth on the worm wheel and threads on the worm which are different in contour and design from either of the above-mentioned types.

Since this construction is just in its infancy, it should certainly be of particular interest to every engineer and manufacturer of motor trucks and axles.



**Comparative Sizes of Gears of a Two and a Half Ton Straight Worm Wheel and the Benson Globoid Worm Wheel**



**Phantom View of Housing, Showing Trunnions.**

The curved worm is mounted on trunnions cast integral with the housing, which permits the curved worm to automatically adjust itself to a perfect contact with the gear.

## Ten Million to be Used on Highway

A total of \$31,284,520 has been spent in improving the Lincoln Highway in the past seven years. An aggregate of \$10,000,000, according to the present plans, will be utilized for road improvement during 1921.

By the end of 1920 the highway from New York to San Francisco covered 3305 miles, of which 2853 miles had been improved. These figures may be compared with those of 1913, when out of a mileage of 3389, a total of 1598 miles had been improved.

At present there are the following types of surfacing on the highway: Concrete, brick, bit. macadam, macadam asphalt, creosote block, granite block, graded gravel, natural gravel, graded earth, natural earth and sand.

# SERVICE AND REPAIR DEPARTMENTS

Conducted by C. P. SHATTUCK

## Factory Methods of Overhauling Lycoming Truck Engines

**T**HE following are the approved factory methods of disassembling, installing new components, adjusting and reassembling the Models "K," "K A" and "K B" Lycoming engines, having a bore and stroke of  $3\frac{1}{2} \times 5$  in., which are manufactured by the Lycoming Motors Corp., Williamsport, Pa.

The directions given herein are for a complete overhaul or rebuild, but no instructions are given for disconnecting the propeller shaft, fuel line, exhaust manifold, etc., or the various linkage necessary to the removal of the power plant or for detaching the clutch or transmission. Neither are directions given for removing carbon, grinding valves, adjusting bearings, etc., work with which the mechanic should be familiar. Attention is directed to the various illustrations of components and component parts, and a study of these before starting the work will greatly facilitate the steps and conserve time. Use is made of the factory name part throughout and orders for new parts should bear the factory part name as well as number

and required number. The model of the engine should also be given. The overhaul will be greatly facilitated if a reversible type of engine stand be employed, as it will greatly reduce the labor charge to the customer.

The Model "K" and "K A" employs a

magneto for ignition, the latter differing in that the magneto is chain driven. Model "K B" employs a timer-distributor, a battery system. With this model the drive-shaft is mounted in the timing gear cover. Where battery ignition is used with the Model "K" the drive is similar. With the

exception of the drive for the ignition units the models are the same and the parts interchangeable which greatly simplifies service.

### Wrench Sizes Required in Overhaul

The nuts and bolts are S. A. E. standard and a wrench with openings of 5-16 in. and  $\frac{3}{8}$  in. will be required in the greater number of operations. The dimensions of other nuts and bolts are:  $\frac{1}{4}$ , 7-16,  $\frac{1}{2}$ ,  $\frac{3}{4}$  and 1  $\frac{1}{4}$  in.

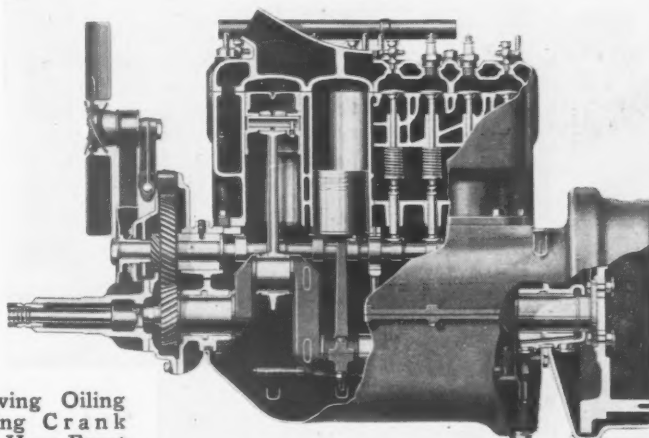
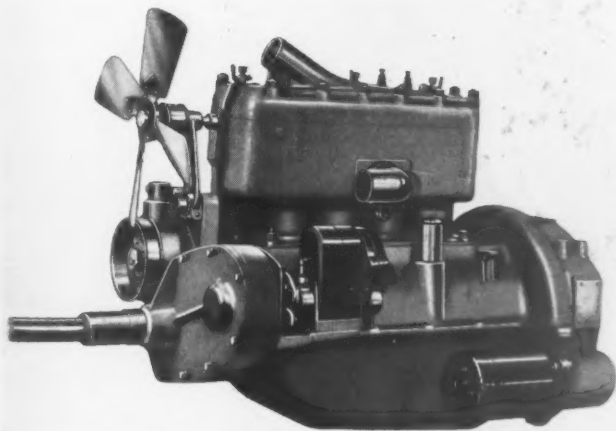
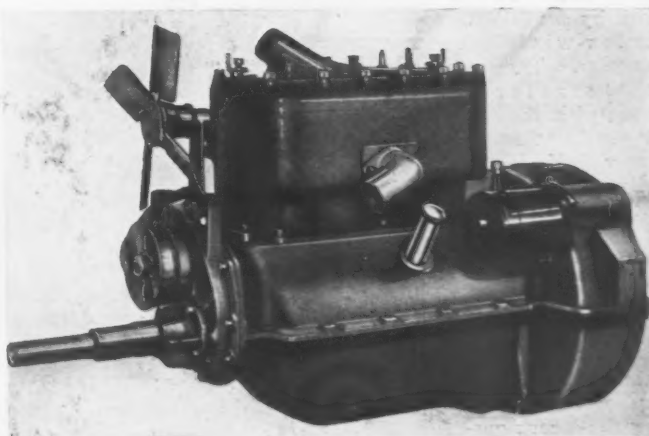


Fig. 1. Showing Oiling System, Starting Crank Assembly and How Front Camshaft Bushing is Secured.



The Model "K A" Lycoming Engine, Magneto Chain Driven



The Model "K B" Lycoming Engine Employing Battery Ignition



The factory order of removing units or assemblies is as follows:

- |                    |                     |
|--------------------|---------------------|
| 1 Water Manifolds  | 11 Crankshaft Gear  |
| 2 Ignition         | 12 Camshaft Gear    |
| 3 Carburetor       | 13 Cylinder Head    |
| 4 Intake Pipe      | 14 Cylinder Head    |
| 5 Oil Pan          | 15 Connecting Rods  |
| 6 Fan Bracket      | 16 Crankshaft       |
| 7 Fan Pulley       | 17 Oil Pump Plunger |
| 8 Timing Gear Case | 18 Camshaft         |
| 9 Starting Motor   | 19 Ignition Drive   |
| 10 Generator       | 20 Starting Crank   |

Remove water inlet manifold held on two studs by two  $\frac{3}{8}$  in. S. A. E. nuts. The gasket is NOT shellaced. Remove

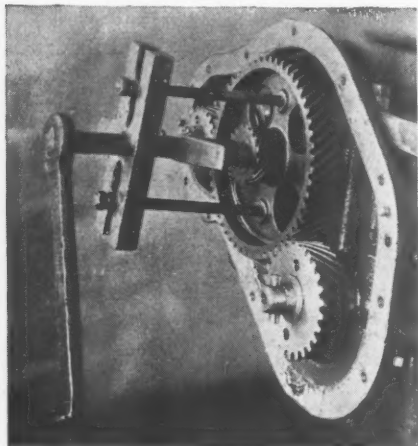


Fig. 2. The Factory Tool for Removing Timing Gears

It is adjustable and can be constructed by the average mechanic and will be needed in rebuilding engine

four  $\frac{3}{8}$  in. hex-headed bolts with lock washers on either side of bell housing, two points of the three-point suspension. There are lugs or pads supporting the rear of engine in chassis. Remove the front suspension bolts. There are two or three. Remove engine to stand. Displace clutch and transmission as a unit. Remove timer-distributor. (Model "K B.") Remove carburetor and intake pipe as a unit. Latter is displaced by removing two  $\frac{3}{8}$  in. nuts from studs.

The flywheel housing is in two sections. The upper is integral with the crankcase and the lower half is bolted to it by six 5-16 in. bolts with lock washers. The engine starter is mounted in the lower half. Remove lower half of flywheel housing. Remove oil drain plug in oil pan (lower half of crankcase) and near flywheel end of pan. Drain oil. The oil pan is secured to the upper case by 14 5-16 in. cap screws and there is a cork gasket which is secured to upper half of the crankcase by shel-

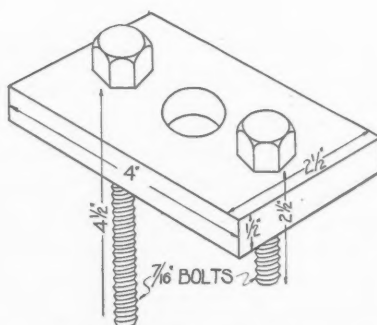


Fig. 3. Sketch Showing Construction and Dimensions of Gear Puller

lac. The oil pan side of gasket is coated with grease and oil pan can be removed without injury to the gasket. Do NOT use any tool between oil pan and gasket as pan can be easily displaced by hand. Remove oil pan and be careful not to bend oil float rod.

Remove fan bracket assembly by loosening the  $\frac{3}{8}$  in. cap screw at lower end of bracket and slip bracket off its stud. The fan pulley is mounted on a shaft with a Woodruff key and locked by a  $\frac{7}{8}$  in. S. A. E. nut with lock washer. To remove fan pulley first place three  $\frac{1}{4}$  in. 24 thread screws with lock washers holding the packing gland in place. Remove nut and lock washer. Use a puller to remove pulley.

The timing-gear case or cover is bolted to the front end of the crankcase by 14 5-16 in. cap screws with lock washers and there are two straight dowels or pins in upper half of crankcase for aligning cover with case. A paper gasket is interposed between the case and cover and that side in contact with the case is coated with shellac. Remove the cap screws and grasp starting crankshaft housing and rock up and down. This will detach cover. A new gasket should not be necessary in

the reassembly. The generator is mounted in the upper half of the crankcase and is gear driven from the camshaft. (See Fig. 5.) To remove generator back off three  $\frac{3}{8}$  in. nuts with plate washers, pull out generator with flange and gear as a unit.

The next step is to remove the crankshaft gear. (See Figs. 2 and 5.) The starting crankpin in crankshaft gear is locked by a  $\frac{1}{8}$  x  $\frac{1}{2}$  in. pin constructed of wire and the pin is driven through the opening in end of shaft and at right an-

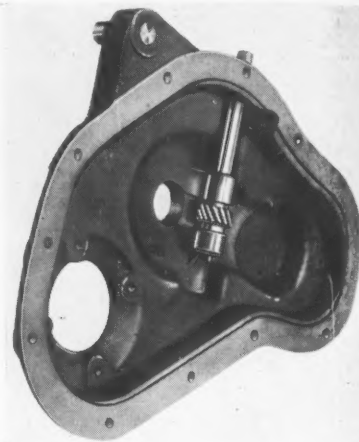


Fig. 4. Showing the Interior of Timing Gear Cover and Battery Ignition Drive Assembly

gles to the starting crankpin. Driving out the crankpin will shear the lock pin or wire. A new one will be necessary. Before removing crankshaft gear, note if this gear and camshaft gear are marked. A tooth of the crankshaft gear should be prick-punched and two teeth of the camshaft gear also marked or as shown in Fig. 5. This makes correct replacement and timing of gears a simple matter. If gears be not marked prick punch them as shown in the illustration. All timing

gears bear a number simplifying ordering new, and all screw holes are  $\frac{3}{8}$  in. U. S. standard thread. USE A GEAR PULLER TO REMOVE ALL GEARS.

The small gear in front of the camshaft gear (drives timer-distributor shaft) is keyed to shaft with a No. 3 Woodruff and the large or camshaft gear is keyed with a No. 9 Woodruff. The small and large gears are removed as a unit but a PULLER MUST BE USED. (See Fig. 3.)

The cylinder head is held by 16  $\frac{1}{2}$  in. nuts with plate washers and there is the conventional copper-asbestos gasket. No shellac is used on the gas-

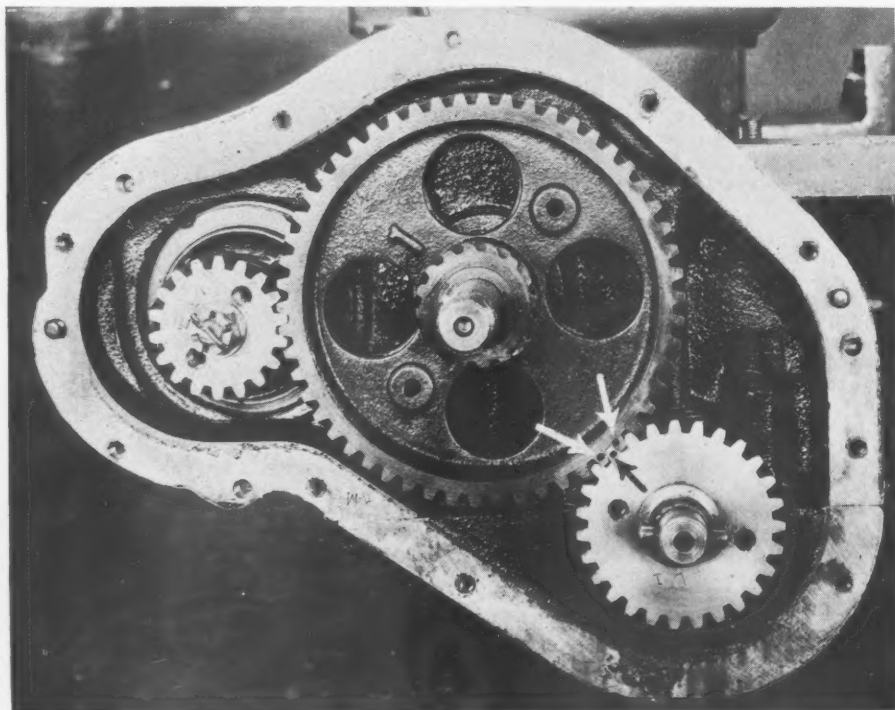


Fig. 5. Timing and Generator Gears Exposed and Showing Punch Marks on Camshaft and Crankshaft Gears, Facilitating Timing

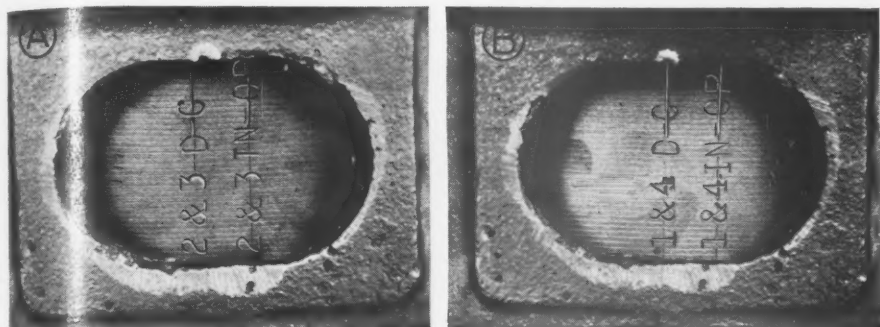


Fig. 6. Flywheel Timing Marks: A, Used When Removing and Replacing Cylinder Bloc; B, Dead Center of Pistons 1 and 4

ket and it should be replaced in same order as removed. Remove the cylinder head. Remove plate over top of upper flywheel or bell housing and turn crankshaft until marks 2-3 D-C align with center mark on housing or as shown at A in Fig. 6, depicting timing marks. This should be done before removing the cylinder bloc as it will bring pistons 2 and 3 to top dead center, thereby largely avoiding the possibility of bending the connecting rods when lifting off the bloc. Remove eight 7-16 in. S. A. E. nuts with lock washers, securing bloc to case, and

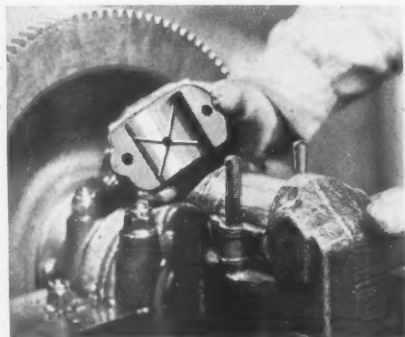


Fig. 7. In Removing Connecting Rod Caps Hold Rod and Bolts as Shown and Keep Shims in Place

remove bloc by lifting straight up or in a vertical plane.

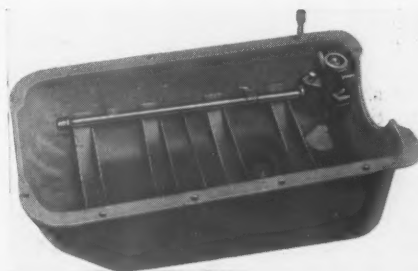
Reverse engine in stand. Connecting rods 1 and 4 are now accessible for removal. Remove cotter pins from nuts (2) of rod cap, No. 1, and with left hand hold rod as shown in Fig. 7. Back off nuts, and lift off cap. Lower rod with piston and slip-on cap and catch nuts. This method is recommended as it insures shims remaining in place and nuts on original bolts. Remove No. 4 rod in same manner then turn crankshaft through 180 deg. or a full half turn and remove rods with pistons 2 and 3.

Note: With the Lycoming engines it is possible to remove a rod with piston and rings from the cylinder bloc from the bottom of the bloc and without removing the cylinder head. The bottom of the cylinder is chamfered, permitting of easy replacement of the piston with rings.

There are two main bearings and of the split type. The front main bearing cap differs from the rear in that it has two 5-16 in. cap screws in addition to the four nuts with lock washers. Remove cotter pins from main bearing cap nuts, back off

nuts, remove lock washers and cap screws (2), and remove caps. Replace nuts to keep shims in position.

The lubricating oil is circulated by a plunger pump mounted in the oil pan and is screened. The plunger or oil push rod is actuated by an eccentric on the camshaft (see Fig. 8) and this PLUNGER MUST BE REMOVED BEFORE THE CAMSHAFT. To remove plunger dis-



The Oil Pan With Pump and Tube With Holes Through Which Oil is Fed to the Troughs

place cotter pin and pull rod up and out through case. Statement is made that it is rare that the camshaft or its bushings will require removal but the operation is given. There are three bushings or bearings. The front is  $1\frac{1}{4} \times 2\frac{3}{8}$ ; center,  $\frac{3}{4} \times 1\frac{5}{8}$ ; rear, which has an expansion plug,  $1\frac{1}{4} \times 2\frac{1}{4}$  I. D. The bushings are locked in the case by dog-pointed screws, the screws for the center and rear being in the side of the case and removed from the outside, while the front is a vertical screw on the top of the case between fan bracket and cylinder bloc. The front screw has a 7-16 in. lock nut.

Remove the front camshaft bushing lock screws. A special puller will be required to remove the camshaft which is displaced with the front bushing. It can be constructed of  $\frac{1}{2}$  in. stock 4 x  $2\frac{1}{2}$ . Drill and tap center of plate for  $\frac{7}{8}$ , 18 thread hole. Drill and tap plate for two 7-16 in. holes, one on either side of first

named hole. Thread two bolts, one about  $4\frac{1}{2}$  in. long and another about  $2\frac{1}{2}$ , to screw into the plate. To use puller, screw plate on camshaft and lock with nut to avoid stresses on threads of shaft. Screw up bolts in plate until against case, then tighten both evenly. Tap nut on shaft gently to start shaft with bushing, then continue to turn small bolts, drawing shaft out with bushing. Remove center and rear camshaft bushing lock screws. Drive out bushings with section of pipe.

By referring to Fig. 9, showing the rear and center camshaft bushings split or cut to show interior, it will be noted that they have oil grooves or channels. It will also be noted that there is a hole drilled through the bushing and groove. These oil holes register with oil holes in the crankcase. New or replacement bushings do NOT come drilled for either the oil or lock screw holes, as the holes are drilled after the bushing has been installed in the case.

As it is IMPORTANT THAT BUSHINGS BE CORRECTLY LOCATED; that is, the oil holes be in a groove and register with oil hole in case, the following method of installation is recommended. For example, when replacing rear bushing with a new one place the old

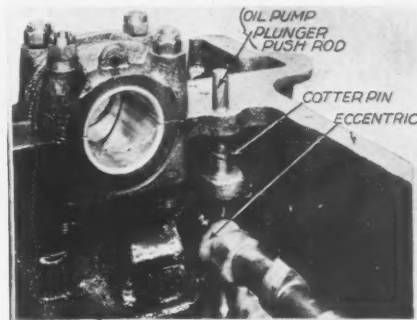
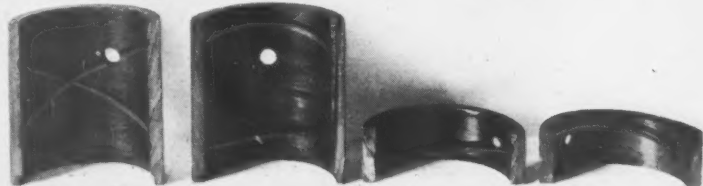


Fig. 8. The Oil Push Rod is Actuated by Camshaft and Should be Removed Before Displacing Camshaft. Push Rod is Secured by a Cotter Pin.

bushing in front of opening in case and so that oil hole in case would register with that in bushing were the latter slipped in position. It will be noted that the oil grooves cross or intersect just above the oil hole. Turn new bushing until the holes align with old or until point where grooves cross is aligned, then insert bushing. In driving in, make sure that bushing does not turn. Check up position before drilling holes. Employ a  $\frac{1}{4}$  in. drill, and be sure to keep the drill in a horizontal plane. Drill through screw hole side, then through opposite wall of housing. The drill should pierce the oil groove diametrically opposite and, after

Fig. 9. The Expansion Plug and Center Bushing Cut in Two.

Showing oil grooves and relation of oil and screw holes to one another.





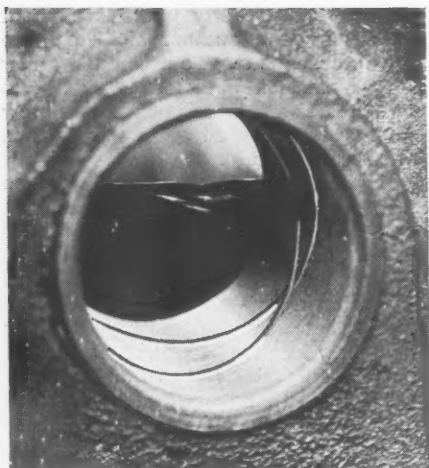


Fig. 10. Showing How Drill is Used and Passing Through Oil Groove as Well as Aligning Holes in Web With Those in Bushing Which is Important

going through bushing, should enter oil channel in case through which oil is supplied the bushing. Illustration 10 shows how the drill is employed. The front and center bushing holes (screw and oil) differ from the rear in that the holes are about 90 deg. apart. (See Fig. 11.) With these the drilling operation is simpler but it is equally important that the OIL HOLES IN BUSHINGS REGISTER WITH THOSE IN THE CRANKCASE WEB. When new bushings are installed they should be line reamed to insure a satisfactory job. Clean bushings and shaft, cover with oil and replace camshaft assembly. Replace oil pump push rod or plunger and insert cotter pin in rod.

Main bearings are installed at the factory with two .002 and two .003 in. shims on either side although there may be three .002. When taking up a main bearing it may be practical to remove a .003 in. shim and replace it with a .002. When new main bearings are installed they should be line reamed and burnished, the factory holding the method preferable to scraping in by hand.

When new connecting rod bearings are installed they must be drilled in the rod half with two  $\frac{1}{4}$  in. holes and in the cap half with one  $\frac{1}{4}$  in. hole to insure sufficient lubrication. When installing new main bearings oil holes should be drilled in upper part of bearing in line with the oil holes in the crankcase which communicate with the oil pockets.

The piston pins are of the fixed type, locked by a screw which is pinned. To remove piston pin to install new bushing

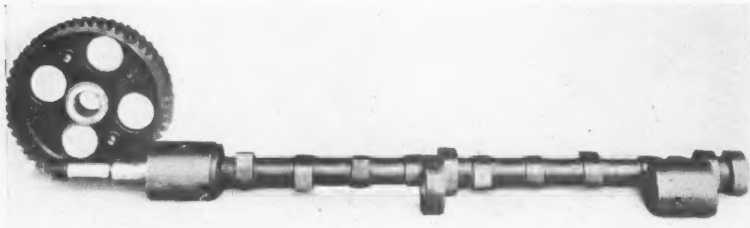


Fig. 11. Camshaft With Gear Removed and With Front Bushing on Shaft. The Center and Expansion Plug Bushings Are Shown Displaced

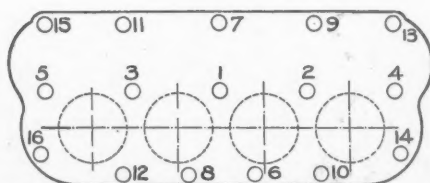


Fig. 15. Diagram, Showing Proper Order of Tightening Cylinder Head Nuts on Studs

remove cotter pin and back out lock screw. Drive out piston pin with a pilot drift from end opposite to lock screw. The bushing is bronze and is reamed to fit new piston pin and so that when piston is held the free end of rod will drop of its weight or with slight push.

After installing new rod bearings, piston pin and piston pin bushing it is important that the pin align with crankshaft and that the piston is not out of square with crankpin. The factory tool for checking the assembly is shown in Fig. 12, and a bearing mandrel can be employed for this work. In replacing the connecting rod caps it is important that the dowel pin of metal bearing be on side next to the timing gears or as shown in Fig. 13, otherwise the oil scoop will not pick up lubricant from the troughs. If new shims are required on the connecting rod the factory number and dimensions are as follows: Three .002, three .005 and

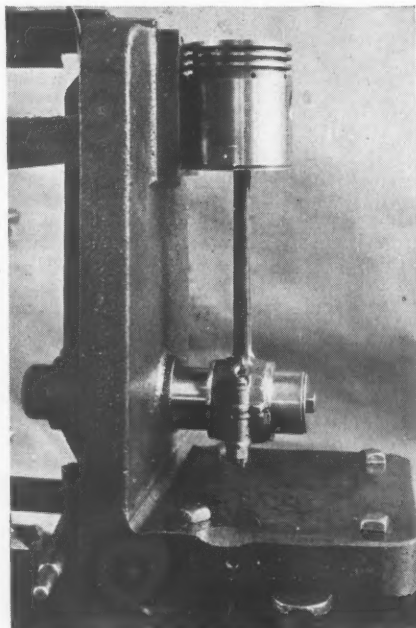


Fig. 12. Factory Method of Assuring Rod and Piston Parallel With Cylinder

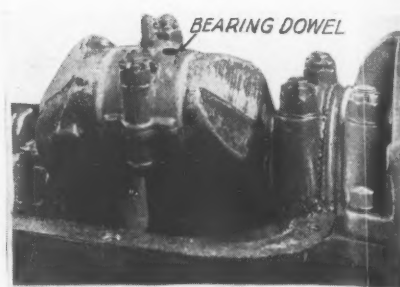


Fig. 13. Rod Caps Should be Replaced With Dowel of Bearing-in Cap Facing Timing Gear End of Case so That Oil Scoop Will Face in Right Direction.

one .109 in. on either side. The material is brass.

When cylinders are to be reground and new pistons and rings used, the factory recommends a piston clearance or tolerance of .0025 in. Oversize pistons with rings fitted are supplied by the Lycoming Motors Corp. in sizes ranging from .005 to .030 in. over standard.

There are three different types of drives for the ignition unit (timer distributor). One is the S. A. E. standard design having a 1 1-16 in. diameter shank, and driven through a tongue and slot coupling. The second type is designed to take a distributor having a shank bored out to fit over the  $\frac{1}{2}$  in. diameter shaft which extends through the top of the gear case. The third design is similar in construction to the S. A. E. type with the exception that a  $\frac{7}{8}$  in. distributor shank is used. The drive for the distributor shaft is by two spiral gears, one of which is mounted on the camshaft and is in mesh with another mounted on the  $\frac{1}{2}$  in. distributor shaft, and held in place by a split head taper pin (see Figs. 4, 5 and 14). To disassemble distributor drive remove taper pin from small spiral gear in the vertical shaft. Use an offset rod to drive out shaft and drive upward through the bushing. The distributor shaft is provided with three bearings; a flanged bronze bushing in the bottom, a straight bronze bushing in the center and a cast-iron bushing at top where the S. A. E. design is used. Where the distributor is bored to fit over the  $\frac{1}{2}$  in. shaft a plain type bushing is used in the top of the case. Fig. 14 shows the unit completely disassembled, but the component parts in proper order of assembly. In replacing the top bushing, the circular groove must be on top. When installing new component parts it will be noted that the gear has but one hole. The other must be drilled when

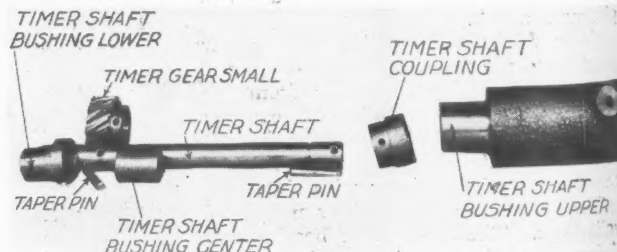


Fig. 14. The Timer-Distributor (Ignition Unit) Assembly Disassembled and the Component Parts in Proper Order of Assembly

gear is on the shaft. The top member or coupling also has but one hole and the other must be similarly drilled. Taper pins are used.

If the ignition unit is displaced it will have to be retimed. To retime turn crankshaft until the piston of the No. 1 cylinder is on top dead center on compression of compression stroke at which time the marks 1 and 4 D. C. should align with center marks on case. Fully retard the spark lever and adjust breaker mechanism so that points just begin to separate. This operation should be performed, of course, with the linkage connected. The firing order of all Lycoming engines is 1-3-4-2.

As the camshaft and crankshaft gears are marked, correct retiming is made easy. Replace camshaft and small gear on shaft and turn shaft until the camshaft gear occupies approximately the same position as shown in Fig. 5. Replace crankshaft gear on shaft, turning it so that the marked tooth will be between the two marked teeth of the camshaft gear. Replace starting crank pin and fit new lock pin or wire. If main bearings have been replaced it will be necessary to first start gear on crankshaft and turn the shaft until position for proper mesh of gears is obtained, then drive gear in place.

The possibility of springing the connecting rods when replacing the cylinder bloc will be largely avoided if the pistons 2 and 3 are uppermost. The cylinder walls, pistons and rings should be well covered with oil before replacing the bloc. In replacing cylinder head gasket place the brass side of gasket down or next to the bloc and tighten the nuts on studs in the order shown in Fig. 15, starting with No. 1. Nuts should be gone over a second time after engine is warm.

Should it be necessary to install a new flywheel, the periphery of which is marked with the timing, proceed as follows: With engine in stand with cylinder bloc down, turn crankshaft until the crank throws of 1 and 4 are uppermost or in a vertical plane. Turn flywheel until marks 1 and 4 D. C. are uppermost. The four holes in the crankshaft flange and those in the flywheel should align. Insert bolts, tighten nuts and insert cotter pins. In the event the starting crank assembly or its bracket is damaged through accident, the crank may be removed by unscrewing the 1 1/4 in. starting crank plug serving to retain the starting crankshaft and acting as a bearing. The bracket is bolted to the timing gear case.

#### Magneto Drive Assembly

When a magneto is employed with Model "K" it is mounted on a removable bracket with a flange that is bolted to the crankcase by three 3/8-in. studs. Mounted in the flange is a shaft carrying a gear at one end and a coupling at the other. The gear, which has 27 teeth, meshes with the camshaft gear, which has 54 teeth. The magneto gear rotates clockwise. The bracket assembly is shown in illustration, Fig. 16. The complete disassembly is shown in Fig. 17.

To remove the magneto only displace the nuts and bolts (2) from the coupling and spacer and lift magneto off. To remove the entire disassembly remove the three 3/8-in. nuts and plate washers from

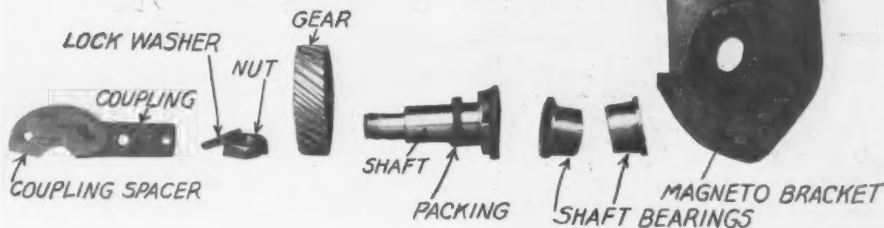


Fig. 17. The Magneto Drive Assembly and With Components Arranged in Order for Reassembly

the studs securing flange of bracket to crankcase and pull assembly straight out. The shaft driving the magneto is carried

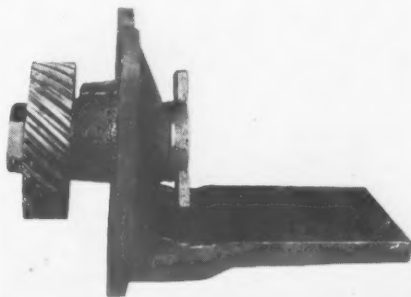


Fig. 16. The Magneto Bracket and Showing Flange With Drive Shaft and Gear

in two bronze bushings. To install new bushings proceed as follows:

#### Installing New Shaft Bushings

With bracket assembly removed from engine displace bolts in coupling. Hold shaft to prevent its turning and remove nut and lock washers in front of gear. Use a gear puller to remove gear which is keyed to shaft. Drive shaft back and out of coupling end of flange. Use a piece of 3/4-in. round stock to drive out bushings (2). There is a space or clear-

ance of 1/2 in. between small ends of bushings serving as an oil pocket. There is also a felt packing on shaft next to the coupling end. Press in new bushings and drill a 1/8-in. hole through bushing and in line with hole in oil pocket. Drill a 1/4-in. oil drain hole in line with hole in bottom of casting. To reassemble reverse the steps. Follow directions given for replacing generator when replacing magneto; that is, the proper mesh or tooth contact of gears.

#### Timing the Magneto

In replacing the magneto it is important that its gears be correctly meshed with the camshaft gear. Place the piston of the No. 1 cylinder on top dead center or the completion of the compression stroke. Turn magneto shaft until the distributor brush makes contact with the No. 1 segment in distributor. The contact points should just begin to break. Replace magneto assembly meshing gears. The coupling will compensate for any slight movement of driving shaft that may be necessary in remeshing the gears. Provision is made for adjusting the pinion of the generator with the driving gear and the clearance should be about .0025 in. To adjust loosen the two cap screws on top of flange, and move generator towards or away from cylinder bloc as required and tighten screws.

Before replacing the oil pan flush pump with kerosene, wash screen, and float, and MAKE SURE THAT HOLES IN OIL SUPPLY PIPE ARE CLEAR. The oil pump will require no attention other than cleansing. NEVER ATTEMPT TO CHANGE ITS ADJUSTMENT AS IT IS CORRECTLY SET AT THE FACTORY. Thoroughly clean oil pan before replacing. If new outlet or inlet water hose is required use rubber hose of 2 1/4 in. inside diameter, as given in the Replacement Table elsewhere in this issue.

The best results will be obtained from the engine if the oil is drained from the sump at least every 500 miles of service. This is accomplished by removing the pipe plug at the bottom of the oil pan. Replace plug and pour a couple quarts or more of kerosene through the breather. With the switch off run the engine with the starter about a minute, then drain case and refill with new oil and until gage registers with top red mark, which is the proper oil level. If the pump be suspected of being inoperative it can be tested by removing the cap from the oil pump connection pipe on generator side of oil pan and starting the engine. If oil flows the pump is functioning. If not prime it through pipe with cylinder oil.

#### Index of Articles Which Appeared in Previous Issues on Repairing and Overhauling Various Units

Continental Engine, Model C...	Jan., 1919, p. 43
Continental Engine, (cont'd)...	Feb., 1919, p. 91
Vim Clutch, Model 20 & 21...	Mch., 1919, p. 27
Vim Rear Axle, Model 20 & 21...	Apr., 1919, p. 64
Troy Trailers...	May, 1919, p. 32
Vim Engine, Model 20 & 21...	June, 1919, p. 67
Clark Int. Gear Drive Axle...	Aug., 1919, p. 43
Buda Engines...	Sept., 1919, p. 79
Eisemann Magneto...	Nov., 1919, p. 34F
Timken-Detroit Axles...	Dec., 1919, p. 113
Spicer Universal Joint...	Jan., 1920, p. 115
Splitdorf Magneto, Model 448...	Feb., 1920, p. 43
Berling Magneto, Type E-41...	Mch., 1920, p. 35
Detlaff Clutch, Model H...	Apr., 1920, p. 61
Lauraine Impulse Starter...	Apr., 1920, p. 63
Lauraine Magneto...	May, 1920, p. 60
Brown-Lipe Trans., Model 30...	June, 1920, p. 53
Brown-Lipe Trans., Amidships...	July, 1920, p. 57
Teagle Magneto...	Aug., 1920, p. 58
Teagle Impulse Starter...	Aug., 1920, p. 60
Hartford Universal Joint...	Aug., 1920, p. 61
Detroit Gear & Machine Trans., Amidships...	Sept., 1920, p. 61
Bosch Magneto, Models DU4-ZR4...	Oct., 1920, p. 58
North East Ignition System...	Nov., 1920, p. 50
Herschell-Spillman Eng., Model 1700...	Dec., 1920, p. 58
Torbenesen Rear Axle...	Jan., 1921, p. 56
Ross Steering Gears...	Feb., 1921, p. 56
Fafnir Ball Bearing Data...	Mar., 1921, p. 41
Simplex and Duplex Engine Governors...	Apr., 1921, p. 43

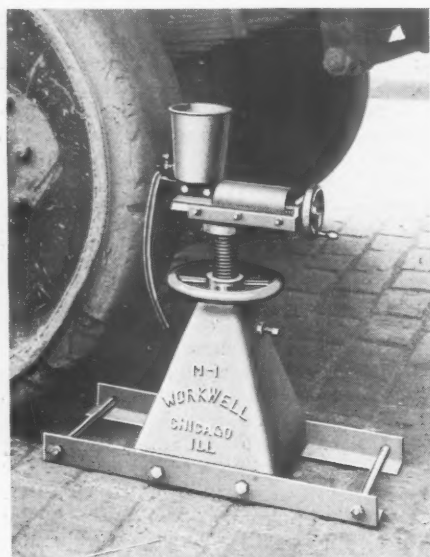


## Service Station and Repair Shop Appliances

### Workwell Solid Tire Regroover

A service that is frequently expected by truck owners of their service stations is that of regrooving solid truck tires. Regrooving worn tires makes them more resilient and prevents skidding. Although this is a service that is comparatively new it has come to be a necessity. Besides owners of regrooving machines are receiving the sales of new tires.

The Workwell Tire Retreading Machine is such a machine. It is manufac-



**Workwell Tire Regroover**

In position opposite the worn tire to be regrooved

tured by the Workwell Eng. & Mfg. Co., 4143-45-47 W. Kinzie St., Chicago, Ill. It is sturdily constructed and is said to contain nothing that is apt to get out of order. The price is \$60 f.o.b. Chicago.

To regroove tires with this machine it is but necessary to jack up the wheel to be grooved, place the regroover opposite the point where the groove is to be cut, raise the cutter slightly above the center diameter of the wheel and start the motor with gears in low. When the wheel jacked up commences to revolve the blade is gradually worked into the tire by a small hand wheel until the groove is cut the desired depth.

### The Lucas Power Forcing Press

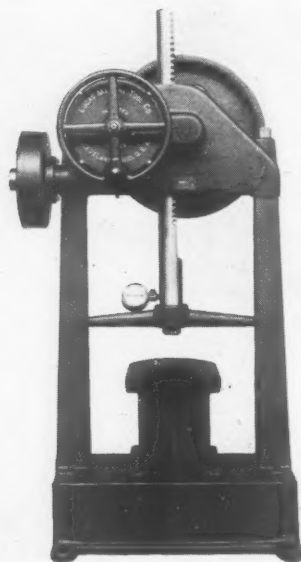
The Lucas Machine Tool Co., Cleveland, Ohio, is offering a press design for a range of work between a hand or screw press and a hydraulic press. It accomplishes by power a variety of work such as forcing arbors, bushings, shafts or pins, etc., in fact, any style of work in which a predetermined stress of any nature must be resisted.

The working features consist of a ram which is powered by gearing controlled

by a hand wheel and friction, which engages a worm wheel driven continuously by a worm on a pulley shaft.

The hand wheel quickly raises or lowers the ram and automatically applies the power when the ram meets with resistance. The amount of pressure obtained is in proportion to the force exerted on the wheel. When resistance ceases the action of the press ceases, making it accident proof.

A pressure-holding attachment, for stacking armature and transformer laminations, etc., can also be obtained but must be ordered with the machine. This attachment is controlled by a pedal which throws the pawls out of engagement, enabling the operation of the press as if without this attachment.



**Lucas Power Forcing Press**

This press is designed to handle a large variety of work, in fact, any work in which a predetermined stress of any nature must be resisted.

The distance between the housings of this 15-ton model is 25 in., and the distance from the base to the end of the ram is 39 in. The net weight of this model is about 2000 lb.

### Fox Arbor Press

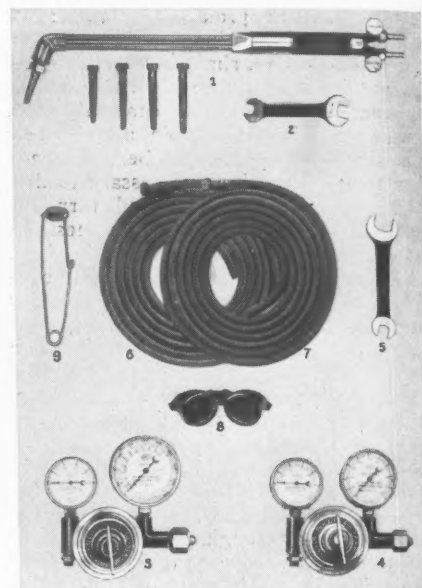
The arbor press of the Omaha Steel Works, Omaha, Neb., is equipped with a special type of table elevating and lowering mechanism, by which most of the weight of the table and lower rack bar is carried by a counter weight at the back of the press. This construction enables raising or lowering of the table to any desired position quickly and with little cost of effort on the part of the operator. This press is known as the Fox No. 4 Arbor Press.

The frame and table of this press are of cast iron and the rack, pinion, pawl and ratchet of a special alloy steel, treated to withstand severe usage.

### Airco Type A Welding Torch Outfit

The Airco "A" Welding Torch Outfit is being produced by the Air Reduction Sales Co., New York, N. Y., for use in automobile work. The various components of this outfit are shown in the accompanying illustration.

Fig. 1, Airco "A" type X 67½ deg. torch and one set Airco tips Nos. 5 to 9, inclusive. Fig. 2, wrench for "A" torch. Fig. 3, Airco oxygen regulator with 3000 lb. gage and 50 lb. gage. Fig. 4, an



**Airco Type A Welding Torch Outfit**  
Designed especially to meet the requirements of general automotive welding

acetylene regulator with 500 lb. gage and 50 lb. gage. Fig. 5, a regulator wrench.

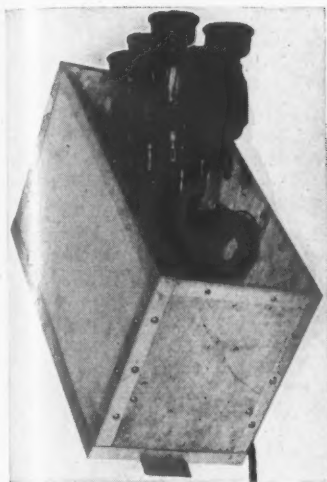
Figs. 6 and 7, 12½ ft. lengths of corrugated red and black ¼ in. 2 ply hoses for the oxygen and acetylene tanks, respectively, complete with tail pieces, nuts and hose clamps. Fig. 8, a pair of goggles and Fig. 9 a spark lighter. This completes the outfit, which is priced at \$120, as shown, or \$131.25, which includes the carrying case.

### New Hyrate Electric Oven

A new electric oven, which is an improvement over an earlier model for drying small parts, was recently announced by the Service Station Supply Co., 30 E. Larned St., Detroit, Mich.

The new model is made of slate asbestos, which is claimed to be a more effective heat retainer. The consumption of current is also said to have been lessened. This oven is particularly useful when used in connection with storage battery opening work. The maker states that it heats the cells rapidly and evenly.

It is made in two types, one for 110-125 volts, and another for 220-250 volts. Handles at the ends permit tilting the



**Hyrate Electric Oven**

It is a later and improved model and has a greater variety of uses. It is made of asbestos plate that retains the heat well

oven for inspection or removal of the battery. The heating units are of such capacity that injury due to too much heat applied will not be done.

This oven is also of value in drying out armatures, etc.

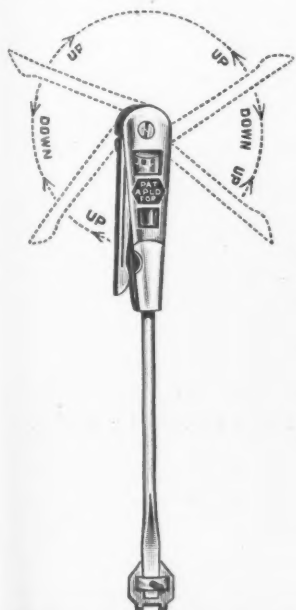
### Common Sense Valve Grinder

The Common Sense Manufacturing Co., Hammond, Ind., is the manufacturer of a new tool known as the Common Sense Valve Grinder.

The main idea followed out in designing this tool was to get the slapping effect, as in using an ordinary screw driver, only in much less time.

The handle is a die casting and the gears are of a special alloy. The oscillating effect is through beveled gears, which have a range of from one-eighth to two turns of the blade to each stroke of the lever.

There is an assortment of stampings which cover all valves and these stampings are attached to the blade in such



**Common Sense Valve Grinder**

With it the same slapping effect is obtained as in using a screw-driver

a way as to act as a universal joint, leaving valve to seat perfectly at all times and allowing the eighth valve of the Ford to be reached under the dash. The lever folds in the handle and by removing the stamping you have a high grade screw driver. This tool retails at \$3.50.

### Heim Centerless Cylindrical Roll Grinder

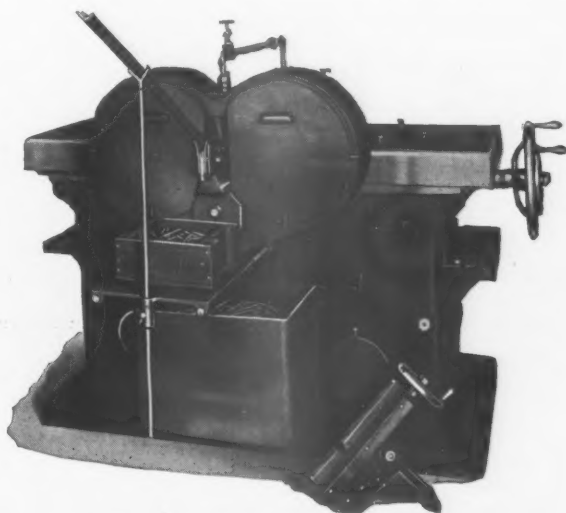
A grinding machine that has been designed for automatically grinding cylindrical work without placing such work on centers is being offered to the trade by the Ball & Roller Bearing Co., Danbury, Conn. It is also adaptable for grinding work. Any cylindrical piece where but one diameter is to be ground, can be taken care of by this machine.

The machine is substantially constructed. It has a grinding wheel and a regulating wheel, each mounted on a slide, movably mounted on the top of the main bed of the machine. The bed has four large openings for tool trays, which renders accessible the mechanism within.

Cooling lubricant is supplied the work by a centrifugal pump. The drive shaft for driving the grinding spindle and conveying power to the regulating spindle and pump is mounted on radial roller bearings enclosed and rotating in oil. A differential gear provides the regulating wheel spindle with four speeds. The lateral thrust on the spindles is against ball bearings. The machine can be provided with tight and loose pulleys or motor-driven direct. A diamond wheel dresser is furnished with the machine. The floor space occupied by the machine is 4 x 6 ft. and the belt-driven machine weighs 4500 lb.

### F. B. Battery Tester

By simply touching the battery tester, manufactured by the F. B. Electric & Manufacturing Co., 29 Atwater St., East, Detroit, Mich., to the cell terminals, accurate knowledge as to the condition of a battery may be readily determined. The instant lighting of a signal lamp, quickly and accurately, actuated by the operation



**Heim Centerless Cylindrical Roll Grinder**

It is adaptable to grinding all kinds of cylindrical work



**F. B. Battery Tester**

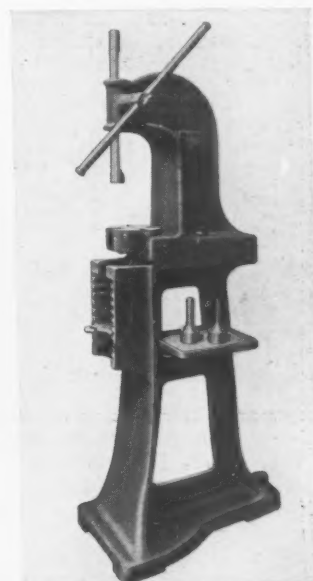
It facilitates the testing of a battery in that it shows a red or green light, indicating the condition of the battery

of an electro-magnetic mechanism, transmits to the tester the information he wants.

If a green signal light is displayed, it is an indication that the battery is in condition and fit for service, but if the light shows red, it is a warning that the battery should be given attention, that its condition is below normal. This device permits testing in the dark and also facilitates and simplifies battery testing work.

### Nicholson Arbor Presses

Two of the presses of W. H. Nicholson & Co., Wilkes-Barre, Pa., are shown herewith. The frames are constructed of semi-steel and the racks, pinions and levers of heat treated chrome nickel steel. No. 2 press, which is sufficient for light machine shop work, is also suitable for arbors up to 1 1/2 in. diam. The net



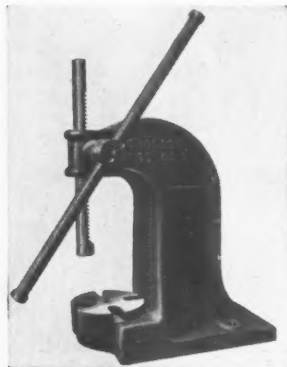
**No. 3 Press on a Stand**

It accommodates a range of work 12 1/2 in. in diam., 12 in. high; pressure, 6750 lb.

weight of this press is 55 lb., the list price, \$29.50.

The No. 3, which is a larger model, is adapted for use in machine shops or garages and will cover a larger range of work than that of the smaller size. This press is suitable for arbors up to 1½ in. in diam. The net weight of the stand is 265 lb. Cost, purchased separately, \$38.

The stand is strong and rigid and has an adjustable shelf that can be moved for



**Nicholson No. 2 Press**

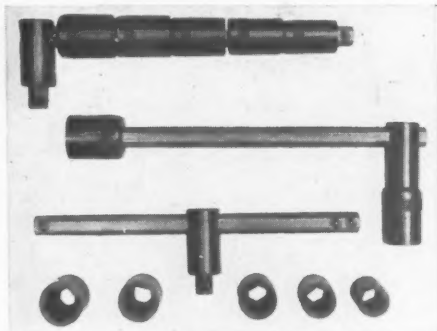
This accommodates a range of work 8½ in. in diameter, 9 in. high; pressure, 3500 lb.

any length arbor or shaft or that can be taken out entirely to accommodate extra long shafts. A tool tray is furnished with each stand. The net weight of the No. 3 press is 134 lb. and the list price \$39.50; the price of press with stand is \$37.50.

### New Bay State Wrench Sets

Two new wrench sets feature the Bay State Pump Co.'s, 564 E. First St., Boston 27, Mass., line. These wrench sets are known as Nos. 21 and 22. The No. 21 socket wrench has sockets machine cut from solid cold rolled steel and carefully heated. The maker states this construction makes the wrench practically indestructible.

The sockets fit the U. S. Standard Hexagon Bolt and Nut sizes up to ½ in., A. L. A. M. Standard up to 9-16 in. and cap screw sizes up to the same. It can be arranged in many combinations, such



**New Bay State Wrench Set**

as L-handle or a T-handle or ratcheting. The ratchet is strong and well built. The price of this wrench in a cardboard box is \$4.50, in a waterproof bag \$5.

The No. 22 wrench set is a smaller set, consisting of one hex. bar, which can be used as an L-handle, T-handle or extension bar; five sockets; a master socket and one hex. adapter, which is removable so that the master socket can be used. The list price is \$2.

### Victor Automatic Steam Vulcanizer

The Victor Vulcanizer, marketed by the Victor Vulcanizer Mfg. Co., 1929 O'Fallon St., St. Louis, Mo., utilizes steam, heated by electricity, the latter being automatically controlled by the steam pressure in connection with an electric switch contained within the steam gage. It is designed for connection to any lamp socket.

The temperature is always the same while this device is in operation, being controlled by the steam pressure. A slight variation in the steam pressure automatically closes the electric circuit.

Water is placed in the vulcanizer at the factory, therefore it does not require any further filling for several months. The quick heating steam chest is made of steel and is stated to hold 60 lb. steam pressure within 8 to 15 minutes, accord-



**Victor Vulcanizer**

This automatic electric steam vulcanizer generates the steam and controls the steam pressure by electricity

ing to the size of the chest. The electric heater is made of the best nichrome wire and is guaranteed for one year.

No. 1—2 tube, 5½ in. x 12 in., alternating current, list price \$50, direct current, \$55; No. 2—4 tube, 5½ in. x 24 in., alternating current, list price, \$68, direct current, \$73; No. 3—6 tube, 5½ in. x 30 in., alternating current, list price, \$78, direct current, \$83.

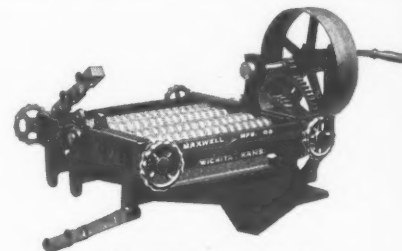
### Maxwell Bead Cutter

Maxwell Mfg. Co., Wichita, Kans., are offering equipment for tire repair shops, the latest of which includes the Maxwell Bead Cutter, tread puller and shearer. These products are featured by their simplicity of operation.

The Maxwell Bead Cutter is a machine for removing the bead from old tires. It is adjustable for cutting above the heel of the bead on clincher tires so that when the bead is removed two plies of the fabric, the full diameter of the tire or clear to the toe of the bead is exposed.

This machine feeds the tire around and handles all sizes.

The Maxwell Tread Puller pulls the tread or old casings and can also be used for pulling plies of fabric apart. The machine is operated by putting the fabric or the whole tire between one pair of corrugated groove rollers, all of which are geared and turn in opposite directions, pulling the tread off or the plies of fabric apart as desired. This machine enables the pulling off of the tread and

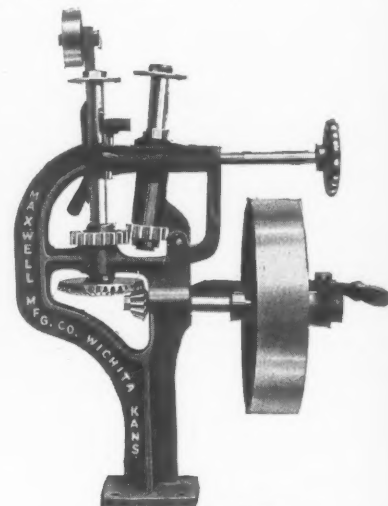


**Maxwell Tread Puller**

For removing the tread from old casings or for pulling plies of fabric apart

the leaving of the fabric in one circumference.

The Maxwell Shear, which is for cutting tire fabric, is also adopted for shearing battery separators to any size. It will cut a whole tire in two after the beads have been removed and will shear anything pliable.



**Maxwell Bead Cutter**

Designed for cutting beads off old tires on all sizes of tires

### Autoquip Valve Grinder

The Autoquip Mfg. Co., Inc., Rochester, N. Y., recently introduced a new appliance known as the Autoquip valve grinder. With it, the maker states, valves can be resealed or reground in a few minutes.

A simple rack and gear mechanical movement, which performs a five-eighths reciprocating motion, is brought into action by the continuous turning of the grinder's crank. This construction is such as to permit free movement without jerk or jar. The same tension is maintained on the valve seat at all times; this is made possible because of the spring telescoped in the valve stem.

This tool sells at \$5. Additional bits are furnished for various types of valves.



# Replacement Table—Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Hose Sizes, Fan Belt Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter Will be Found Either the Size of Main Air Intake or the Gasoline Fuel Line

Fan Belt Type: V—V-Shape, F—Flat, R—Round

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service			Emergency				Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R-1—1920.....	4	1 1/4	1 1/4	1 1/4	1 1/4	10 3/4	2 1/4	6 1/4	2	37 1/2	1 1/4	F	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason RB-1 1/2—1920.....	4	1 1/4	1 1/4	1 1/4	1 1/4	10 3/4	2 1/4	6 1/4	2	37 1/2	1 1/4	F	11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason H-2 1/2—1920.....	3	1 1/4	1 1/4	1 1/4	1 1/4	10 3/4	2 1/4	6 1/4	2	37 1/2	1 1/4	F	13 1/2	3	1/4	2	13 1/2	3	1/4	2	130	35
Acason L-3 1/2—1920.....	3	1 1/4	1 1/4	1 1/4	1 1/4	10 3/4	2 1/4	6 1/4	2	37 1/2	1 1/4	F	16	3	1/4	2	16	3	1/4	2	163 3/4	35
Acason M-5—1920.....	3	1 1/4	1 1/4	1 1/4	1 1/4	10 3/4	2 1/4	6 1/4	2	37 1/2	1 1/4	F	18	3	1/4	2	18	3	1/4	2	167 1/2	35
Ace, Series A 1 1/2—1920.....	3	1 1/4	1 1/4	1 1/4	1 1/4	10 3/4	2 1/4	6 1/4	2	37 1/2	1 1/4	F	12	3	1/4	2	12	3	1/4	2	122 1/2	32
Ace, Series A2 1/2—1919-20.....	4	1 1/4	1 1/4	1 1/4	1 1/4	10 3/4	2 1/4	6 1/4	2	37 1/2	1 1/4	F	13	3	1/4	4	13	3	1/4	4	144 1/2	32
Aeme 1/2.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	2 1/4	11	2 1/4	38 3/4	1 1/4	F	12	2	3/4	4	12	2	3/4	4	110 3/4	34
Aeme B-1—1916-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	2 1/4	11	2 1/4	38 3/4	1 1/4	F	13	2	3/4	4	13	2	3/4	4	110 3/4	34
Aeme F-1 1/2—1919-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	2 1/4	11 1/2	1 1/2	40	1 1/4	F	12	2	3/4	4	12	2	3/4	4	122 1/2	34
Aeme A-2—1916-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	2 1/4	11 1/2	1 1/2	40	1 1/4	F	13	2	3/4	4	13	2	3/4	4	135 1/2	34
Aeme C-3 1/2—1917-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	12	2 1/4	14	2 1/4	33 3/4	1 1/4	F	13	2	3/4	4	13	2	3/4	4	150 1/2	36
Aeme F-5—1919-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	2 1/4	14	2 1/4	33 3/4	1 1/4	F	15 1/2	3	3/4	4	15 1/2	3	3/4	4	160 3/4	37
Apex C-1.....	3	1 1/4	1 1/4	1 1/4	1 1/4	7 1/4	2	12	2	36 1/2	1 1/4	F	18	4	1/4	2	18	4	1/4	2	102	35 1/2
Apex D-1 1/2.....	3	1 1/4	1 1/4	1 1/4	1 1/4	7 1/4	2	12	2	36 1/2	1 1/4	F	42	4	1/4	2	42	4	1/4	2	102	35 1/2
Apex E-2 1/2.....	4	1 1/4	1 1/4	1 1/4	1 1/4	7 1/4	2 1/4	8	2	32	1 1/4	F	54	2	1/4	2	54	2	1/4	2	102	35 1/2
Armleder 20.....	4	1 1/4	1 1/4	1 1/4	1 1/4	13	1 3/4	16 1/2	1 1/4	31 3/4	2 1/4	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	104 1/4	32
Armleder KW-3 1/2—1916-20.....	4	1 1/4	1 1/4	1 1/4	1 1/4	12 1/4	2 1/4	16 1/2	1 1/4	36	2 1/4	F	42	3	1/4	4	42	3	1/4	4	150	36
Armleder HW-2 1/2—1916-20.....	4	1 1/4	1 1/4	1 1/4	1 1/4	10	2 1/4	11 1/2	1 1/4	34	2 1/4	F	13 1/4	3	1/4	4	13 1/4	3	1/4	4	140	32
Atco B-1 1/2.....	4	1 1/4	1 1/4	1 1/4	1 1/4	11	2 1/4	11	2 1/4	31 1/2	2 1/4	F	25 1/2	2	1/4	4	18	2 1/4	1/4	4	109 3/4	32
Atco B1-1 1/2.....	4	1 1/4	1 1/4	1 1/4	1 1/4	11	2 1/4	11	2 1/4	31 1/2	2 1/4	F	25 1/2	2	1/4	4	18	2 1/4	1/4	4	124 1/4	32
Atco A-2 1/2.....	4	1 1/4	1 1/4	1 1/4	1 1/4	12	2 1/4	11	2 1/4	33 3/4	1 1/4	F	26	2	1/4	4	18	2 1/4	1/4	4	109 3/4	32
Atterbury 20R-1 1/2—1920.....	4	1 1/4	1 1/4	1 1/4	1 1/4	8	1 1/4	14	1 1/4	38 1/4	1 1/4	F	25 1/2	2	1/4	4	18	2 1/4	1/4	4	124 1/4	33
Atterbury 7CX-2 1/2—1919-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	8 1/2	1 1/4	14	1 1/4	38 1/4	1 1/4	F	11 1/2	3	1/4	4	11 1/2	3	1/4	4	122 1/4	34
Atterbury 7D-3 1/2—1917-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	8 1/2	1 1/4	14	1 1/4	30 1/4	1 1/4	F	13 1/4	3	1/4	4	13 1/4	3	1/4	4	133 3/4	34
Atterbury 8E-5—1919-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	14	2 1/4	20 1/2	2 1/4	41	2 1/4	F	15 3/4	3	1/4	4	15 3/4	3	1/4	4	145 3/4	37 1/2
Autocar XXI-F-2—1915-20.....	4	1 1/4	1 1/4	1 1/4	1 1/4	3	1 1/4	4	1 1/4	.....	.....	F	16 1/4	2	1/4	4	13	2 1/4	1/4	4	157 1/2	37 1/2
Autocar XXI-G-2—1920.....	4	1 1/4	1 1/4	1 1/4	1 1/4	3	1 1/4	4	1 1/4	.....	.....	F	25 1/2	2	1/4	4	13	2 1/4	1/4	4	91	34
Autocar XXVI-Y-4—1920.....	3	1 1/4	1 1/4	1 1/4	1 1/4	3 1/2	1 1/4	3	1 1/4	48 3/4	1 1/2	F	25 1/2	2	1/4	4	25 1/2	2	1/4	4	114	34
Autocar XXVI-B-4—1920.....	3	1 1/4	1 1/4	1 1/4	1 1/4	3 1/2	1 1/4	3	1 1/4	48 3/4	1 1/2	F	25 1/2	2	1/4	4	25 1/2	2	1/4	4	121	34 1/2
Available H-1 1/2—1920.....	4	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	48	2	1/4	4	36	2 1/4	1/4	4	176	34 1/2
Available H-2 1/2—1916-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	48	2	1/4	4	36	2 1/4	1/4	4	120	32
Available H-3—1916-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	42	2 1/4	F	13 1/2	3	1/4	4	13 1/2	3	1/4	4	144	32
Available H-5—1916-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	12	2 1/4	16	2 1/4	40	2 1/4	F	16	4	1/4	4	18	4	1/4	4	168	36
Available H-7—1919-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	12	2 1/4	16	2 1/4	40	2 1/4	F	72	3	1/4	4	72	3	1/4	4	168	38
Avery 1—1920.....	3	1 1/4	1 1/4	1 1/4	1 1/4	10	2 1/4	6 1/2	2 1/4	31 1/4	1 1/2	F	19 1/2	2	1/4	4	18 1/2	2	1/4	4	85	34
Bartlett 70-7.....	3	1 1/4	1 1/4	1 1/4	1 1/4	10	2 1/4	6 1/2	2 1/4	31 1/4	1 1/2	F	50	2	1/4	2	24	2	1/4	2	144	36
Beck-Hawkeye A-1—1912-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	24	2	1/4	4	24	2	1/4	4	114	34
Beck-Hawkeye B-1 1/2—1912-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	24	2	1/4	4	24	2	1/4	4	114	34
Beck-Hawkeye C-2—1912-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	25	2	1/4	4	25	2	1/4	4	114	34
Beck-Hawkeye D-3—1920.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	25	2	1/4	4	25	2	1/4	4	136	72
Bell M1.....	4	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	26	2	1/4	4	26	2	1/4	4	110	34
Bell E-1 1/2.....	4	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	39	2	1/4	4	48	3	1/4	4	114	34
Bell O-2 1/2.....	4	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	48	2	1/4	4	54	3	1/4	4	126	34
Belmont A-1.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	32	2	1/4	4	31	1 1/2	1/4	4	78	34
Belmont B-1 1/2.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	41	2	1/4	4	40	1 1/2	1/4	4	120	36
Belmont C-2.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14	1 1/4	40	2 1/4	F	41	2	1/4	4	40	1 1/2	1/4	4	124	36
Bessemer G-1—1917-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	10	2 1/4	11 1/2	2 1/4	42	1 1/2	V	47 1/2	2	1/4	4	45 1/2	2 1/4	1/4	4	98	34
Bessemer H-2 1/2—1917-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	10	2 1/4	11 1/2	2 1/4	43	1 1/2	V	56 1/2	2	1/4	4	55	2 1/4	1/4	4	116	34
Bessemer J-2 1/2—1919-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	5	1 1/4	12	2 1/4	36 1/4	1 1/2	F	56 1/2	3	1/4	2	55	2 1/4	1/4	2	141	34
Bessemer K-2—1919-20.....	3	1 1/4	1 1/4	1 1/4	1 1/4	10	2 1/4	11 1/2	2 1/4	39 3/4	1 1/2	F	58 1/2	3	1/4	2	30 1/4	4 1/2	1/4	1	157 1/2	38
Bethlehem K-1—1920.....	3	1 1/4	1 1/4	1 1/4	1 1/4	11	1 1/4	14														

## Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING						FRAME					
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service			Emergency			Length	Width				
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Columbia G-2½—1920.	3	1 1/4	1 1/4	1 1/4	V	10	2	10	2	44	3 1/4	V	55	3	1 1/4	2	50	2	1 1/4	2	132	32 1/2
Commerce T-1500.	3	1 1/4	1 1/4	1 1/4	V	10	2	10	2	44	3 1/4	V	50	3	1 1/4	2	48 1/2	2	1 1/4	2	92 1/2	34
Commerce 12-3000.	3	1 1/4	1 1/4	1 1/4	V	10	2	10	2	44	3 1/4	V	45	3	1 1/4	2	43	2	1 1/4	2	92 1/2	34
Commerce 16-4000.	3	1 1/4	1 1/4	1 1/4	V	10	2	10	2	44	3 1/4	V	45	3	1 1/4	2	43	2	1 1/4	2	108 1/2	34
Concord A-1½—1920.	4	1 1/4	1 1/4	1 1/4	H	11	2 3/4	9 1/2	1 1/2	34	2	F	12	3 1/2	1 1/4	4	12	3 1/2	1 1/4	4	108 1/2	32 1/2
Concord B-2½—1920.	4	1 1/4	1 1/4	1 1/4	H	11	2 3/4	9 1/2	1 1/2	34	2	F	13 1/2	3 1/2	1 1/4	4	13 1/2	3 1/2	1 1/4	4	122 1/2	32 1/2
Corbitt E-1—1917-20.	3	1 1/4	1 1/4	1 1/4	V	8	2	14	2	38	3 1/4	V	19	2	1 1/4	2	19	2	1 1/4	2	105	34
Corbitt D-1½—1916-20.	3	1 1/4	1 1/4	1 1/4	V	8	2	14	2	38	3 1/4	V	45 1/4	2	1 1/4	1	45 1/4	2	1 1/4	1	120	34
Corbitt C-2—1915-20.	3	1 1/4	1 1/4	1 1/4	V	14	1 1/4	13	1 1/4	36	1 1/4	F	51 1/2	1	1 1/4	1	51 1/2	2 1/4	1 1/4	1	138	35
Corbitt B-2½—1916-20.	3	1 1/4	1 1/4	1 1/4	V	14	1 1/4	13	1 1/4	36	1 1/4	F	51 1/2	2 1/4	1 1/4	1	51 1/2	2 1/4	1 1/4	1	138	35
Corbitt AA-5—1919-20.	3	1 1/4	1 1/4	1 1/4	V	13	1 1/4	8	1 1/4	36	2	V	69 1/4	3	1 1/4	1	69 1/4	3	1 1/4	1	160	38
Corbitt A-3½—1917-20.	3	1 1/4	1 1/4	1 1/4	V	13	2	14	2	36	1 1/4	V	64	2 1/2	1 1/4	1	64	2 1/2	1 1/4	1	160	35
Couple Gear HC-3½—1906-20.	3	2	1 1/4	1 1/4	V	12	2	12	2	39	1		48	3	1 1/4	2	48	3	1 1/4	2	168	42
Couple Gear AC-5—1908-20.	3	2	1 1/4	1 1/4	V	12	2	12	2	39	1		48	3	1 1/4	2	48	3	1 1/4	2	168	42
Couple Gear LD-6—1917-20.	3	2	1 1/4	1 1/4	V	12	2	12	2	39	1		48	3	1 1/4	2	48	3	1 1/4	2	168	42
Dart H-1—1920-21.	3	1 1/4	1 1/4	1 1/4	H	11	2	8	1 1/2	36	1 1/4	F	19	1 1/4	1 1/4	4	19	1 1/4	1 1/4	4	102	34
Dart S-1½—1920-21.	3	1 1/4	1 1/4	1 1/4	H	11	2	8	1 1/2	36	1 1/4	F	19	1 1/4	1 1/4	4	19	1 1/4	1 1/4	4	112	34
Dart M-2½—1920-21.	3	1 1/4	1 1/4	1 1/4	H	11	2	14	1 1/2	35	2	F	10	2 1/4	1 1/4	2	19	3 1/2	1 1/4	4	124	34
Dart W-3½—1920-21.	4	1 1/4	1 1/4	1 1/4	H	11	2	12	1 1/2	36	2	F	28	2 3/4	1 1/4	4	28	2 3/4	1 1/4	4	144	38
Day-Elder A-1.	3	1 1/4	1 1/4	1 1/4	V	9	2	9	2	40	3 1/4	V	19	2	1 1/4	2	19	2	1 1/4	2	108	35
Day-Elder B-1½.	3	1 1/4	1 1/4	1 1/4	V	9	2	9 1/2	2	40	3 1/4	V	19	2	1 1/4	2	19	2	1 1/4	2	120	35
Day-Elder D-2.	3	1 1/4	1 1/4	1 1/4	V	4	1 1/2	9	1 3/4	35	3 1/4	V	45	2	1 1/4	2	45	2	1 1/4	2	125	35
Day-Elder C-2½.	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	12	1 3/4	36 1/4	2	V	52	2 1/4	1 1/4	2	52	2 1/4	1 1/4	2	123	35
Day-Elder F-3½.	3	1 1/4	1 1/4	1 1/4	V	6 1/2	1 3/4	12	1 1/4	35 1/4	1 1/2	F	56 1/2	2 1/2	1 1/4	2	56 1/2	2 1/2	1 1/4	2	148	35
Day-Elder E-5.	3	1 1/4	1 1/4	1 1/4	V	12 1/2	2	10	1 3/4	38 1/2	1 1/2	F	69	3	1 1/4	2	69	3	1 1/4	2	155	37
Dearborn BW-2—1915-17-19-20.	3	1 1/4	1 1/4	1 1/4	V	8 1/4	2	6	1 3/4	37	1	F	18	2 1/2	1 1/4	2	18	1 1/2	1 1/4	2	130	32
Dearborn F-1½—1915-17-19-20.	3	1 1/4	1 1/4	1 1/4	V	12	2	8	1 1/4	37	1	F	16 1/2	2 1/2	1 1/4	2	16 1/2	1 1/2	1 1/4	2	96 1/2	34
Dearborn C-1—1915-17-19-20.	3	1 1/4	1 1/4	1 1/4	V	12	2	8	1 1/4	37	1	F	38	2	1 1/4	1	38	2	1 1/4	1	107	32
Defiance B-1½—1918-19-20.	3	1 1/4	1 1/4	1 1/4	V	10	2	8	2	40 3/4	1 1/4	F	45	2 1/2	1 1/4	1	43 1/2	2 1/2	1 1/4	1	116	34
Defiance C-2—1918-19-20.	3	1 1/4	1 1/4	1 1/4	V	10	2	8	2	40 3/4	1 1/4	F	54	2 1/2	1 1/4	1	52 1/2	2 1/2	1 1/4	1	116	34
Defiance D—1920-21.	3	1 1/4	1 1/4	1 1/4	V	10	2	8 1/2	1 1/4	40 3/4	1 1/4	F	45 1/4	2 1/2	1 1/4	1	43 1/2	2 1/2	1 1/4	1	120	34
Defiance E—1920-21.	3	1 1/4	1 1/4	1 1/4	V	10	2	8 1/2	1 1/4	40 3/4	1 1/4	F	54 1/4	2 1/2	1 1/4	1	52 1/2	2 1/2	1 1/4	1	120	34
Denby 12-1—1920.	3	1 1/4	1 1/4	1 1/4	V	12	2	9	2	42	3 1/4	V	43 1/2	2 1/2	1 1/4	1	39 1/2	1 1/2	1 1/4	1	98	34
Denby 33-1½—1921.	3	1 1/4	1 1/4	1 1/4	V	12	2	9	2	42	3 1/4	V	8 1/2	4	1 1/4	2	44	1 1/2	1 1/4	1	120	34
Denby 134-2—1920.	3	1 1/4	1 1/4	1 1/4	V	12	2	9	2	42	3 1/4	V	51 1/2	2 1/2	1 1/4	1	47	2	1 1/4	1	127	34
Denby 25-3—1920.	3	1 1/4	1 1/4	1 1/4	V	12	2	9	2	35	1 1/4	F	55 1/2	3	1 1/4	1	51	2	1 1/4	1	127	34
Denby 27-4—1920.	3	1 1/4	1 1/4	1 1/4	V	13	1 1/4	16 1/4	1 1/4	39 3/4	1 1/2	F	61 1/2	3	1 1/4	1	8 1/2	4	1 1/4	2	140	34
Denby 210-5—1920.	3	1 1/4	1 1/4	1 1/4	V	13	1 1/4	16 1/4	1 1/4	39 3/4	1 1/2	F	89	2 1/4	1 1/4	1	8 1/2	4	1 1/4	2	140	34
Dependable Dispatch A-1 1921.	4	1 1/4	1 1/4	1 1/4	V	14	2 1/4	15	1 1/4	37 1/2	2	F	53 1/4	2 1/4	1 1/4	1	38 1/4	2 1/4	1 1/4	1	108	33 1/2
Dependable C-1½—1920-21.	4	1 1/4	1 1/4	1 1/4	V	14	2 1/4	15	1 1/4	37 1/2	2	F	53 1/4	2 1/4	1 1/4	1	38 1/4	2 1/4	1 1/4	1	121	33
Dependable D-2 1920-21.	4	1 1/4	1 1/4	1 1/4	V	10	2 1/4	11 1/2	1 1/4	37 1/2	2	F	53 1/2	2 1/4	1 1/4	1	38 1/4	2 1/4	1 1/4	1	140	33
Dependable E-2½—1920-21.	4	1 1/4	1 1/4	1 1/4	V	10	2 1/4	11 1/2	1 1/4	37 1/2	2	F	63	2 1/4	1 1/4	1	49	2 1/4	1 1/4	1	152	33
Dependable G-3½ 1921.	4	1 1/4	1 1/4	1 1/4	V	13	2	13	1 1/4	37 1/2	2	F	63	2 1/4	1 1/4	1	49	2 1/4	1 1/4	1	170	33
Diamond T-O-1.	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	10 1/2	3	1 1/4	4	10 1/2	3	1 1/4	4	100	34
Diamond T-FS&T-1½.	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	11 1/2	3 1/4	1 1/4	4	11 1/2	3 1/4	1 1/4	4	Opt	34
Diamond T-U-2.	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	13 1/4	3 1/4	1 1/4	4	13 1/4	3 1/4	1 1/4	4	Opt	34
Diamond TK-3½.	3	1 1/4	1 1/4	1 1/4	V	10	1 1/2	10	1 1/2	35	2	F	15 1/2	3 1/4	1 1/4	4	15 1/2	3 1/4	1 1/4	4	Opt	37
Diamond T-EL-5.	3	1 1/4	1 1/4	1 1/4	V	10	1 1/2	10	1 1/2	35	2	F	18	4	1 1/4	4	17 1/4	4	1 1/4	4	Opt	37
Diamond T-S-5.	3	1 1/4	1 1/4	1 1/4	V	9	2	21	2	40 1/2	2	F	18	4	1 1/4	4	17 1/4	4	1 1/4	4	Opt	37
Diehl A.	3	1 1/4	1 1/4	1 1/4	V	9	2	21	2	40 1/2	2	F	28	2 1/2	1 1/4	2	27	2	1 1/4	2	90	34
Doane 2½—1917-1																						



## Replacement Table—Continued

Name, Model and Tonnage	ENGINE											BRAKE LINING							FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency			Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
G.M.C. K-41	4	1 1/4	1 1/4	1 5/8	V	10 1/2	1 3/4	9 1/2	1 3/4	37 1/2	2 3/4	V	13	3 1/2	1/4	4	13	3 1/2	1/4	4	Opt	33
G.M.C. K-71	4	1 1/4	1 1/4	1 5/8	V	11 1/2	1 3/4	9 1/2	1 3/4	37 1/2	2 3/4	V	15 1/2	3 3/4	1/4	4	15 1/2	3 3/4	1/4	4	Opt	38
G.M.C. K-101	4	1 1/4	1 1/4	1 5/8	V	11 1/2	1 3/4	9 1/2	1 3/4	37 1/2	2 3/4	V	17 1/4	3 3/4	1/4	4	17 1/4	3 3/4	1/4	4	Opt	38
Gramm-Bernstein 10-1920	3	1 1/4	1 1/4	1 1/2	H	10 1/2	2	6	2	39	1 1/4	F	48 1/2	2	1/4	2	45 1/2	2 1/4	1/4	2	97	30
Gramm-Bernstein 15-1 1/2-1920	3	1 1/4	1 1/4	1 1/2	H	10 1/2	2	6	2	39	1 1/4	F	19 3/4	2	1 3/4	2	19 3/4	2 1/4	1/4	2	120	32
Gramm-Bernstein 65-1 1/2-1920	3	1 1/4	1 1/4	1 1/2	H	10 1/2	2	6	2	39	1 1/4	F	45	2	1 3/4	2	45	2 1/4	1/4	2	120	32
Gramm-Bernstein 20-2-1920	3	1 1/4	1 1/4	1 1/2	V	11	1 1/2	9	1 1/2	32	2	F	22 3/4	2 1/4	1/4	4	22 3/4	2 1/4	1/4	4	126	32 1/2
Gramm-Bernstein 25-2 1/2-1920	3	1 1/4	1 1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	2	F	22 3/4	2 1/4	1/4	4	22 3/4	2 1/4	1/4	4	129 3/4	36
Gramm-Bernstein 30	3	1 1/4	1 1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	2	F	22 3/4	2 1/4	1/4	4	22 3/4	2 1/4	1/4	4	129 3/4	36
Gramm-Bernstein 35-3 1/2-1920	3	1 1/4	1 1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	2	F	28 3/4	2 1/4	1/4	4	28 3/4	2 1/4	1/4	4	144	36
Gramm-Bernstein 50-5-1920	3	1 1/4	1 1/4	1 1/2	V	23 1/4	2	13 3/4	1 1/4	40 3/4	2	F	32 1/4	2 1/4	1/4	4	32 1/4	2 1/4	1/4	4	162	36
Hall 2-Worm-2 1/2	3	1 1/4	1 1/4	1 1/4	V	8	1 1/4	12 1/2	1 1/4	32	1 1/4	F	11 1/2	3	3 3/4	4	11 1/2	3	3 3/4	4	144	38
Hall 3 1/2-Worm	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 3/4	15 1/2	1 1/4	38 1/2	1 1/2	F	15	3 3/4	1/4	4	15	3 3/4	1/4	4	180	39
Hall 5-Worm	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 3/4	15 1/2	1 1/4	38 1/2	1 1/2	F	18	4	1/4	4	18	4	1/4	4	144	39
Hall 7-Chain	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 3/4	15 1/2	1 1/4	38 1/2	1 1/2	F	18	4	1/4	4	18	4	1/4	4	144	39
Harvey WEA-1 1/2-1919-20	4	1 1/4	1 1/4	1 1/4	V	46	2	2 1/4	2	52	2 1/4	F	52	2 1/4	1/4	2	52	2 1/4	1/4	2	126 1/2	32
Harvey WFA-2 1/2-1919-20	4	1 1/4	1 1/4	1 1/4	V	56	2 1/2	2 1/2	2	56	2 1/2	F	69	3	1/4	2	69	3	1/4	2	144	35
Harvey WHA-3 1/2-1919-20	4	1 1/4	1 1/4	1 1/4	V	69	3	1/4	2	69	3	F	48	2	1/4	2	47	1 1/2	2	112	34	
Harvey WKA-5-1919-20	4	1 1/4	1 1/4	1 1/4	V	54	2 1/2	2 1/2	2	52	2 1/2	F	54	2 1/2	1/4	2	52	2 1/2	1/4	2	112	34
Hawkeye K-1 1/2-1918-20	4	1 1/4	1 1/4	1 1/4	V	12	3 1/2	1/4	4	12	3 1/2	F	16	3 3/4	1/4	4	16	3 3/4	1/4	4	Opt	36
Hawkeye M-2-1919-20	4	1 1/4	1 1/4	1 1/4	V	18	4	1/4	4	18	4	F	18	4	1/4	4	18	4	1/4	4	Opt	38
Hendrickson I-2 1/2	3	1 1/4	1 1/4	1 1/4	V	57	2 1/2	1/4	2	57	2 1/2	V	69	3	1/4	2	69	3	1/4	2	147	38
Hendrickson J-3 1/2	3	1 1/4	1 1/4	1 1/4	V	12	1 1/2	1/4	2	12	1 1/2	R	18	2	1/4	2	18	2	1/4	2	85	32
Hendrickson K-5	3	1 1/4	1 1/4	1 1/4	V	44	2 1/4	1/4	2	44	2 1/4	R	22	2	1/4	2	22	2	1/4	2	100	32
Highway Knight A	3	1 1/4	1 1/4	1 1/4	V	26	3	1/4	2	26	3	F	24	2 1/2	1/4	2	24	2 1/2	1/4	2	123	32
Highway Knight B-5	3	1 1/4	1 1/4	1 1/4	V	26	3	1/4	2	26	3	F	24	2 1/2	1/4	2	24	2 1/2	1/4	2	123	32
Higraide A18-1-1918-19	3	1 1/4	1 1/4	1 1/4	V	28	3	1/4	2	28	3	F	24	2 1/2	1/4	2	24	2 1/2	1/4	2	132	32
Higraide B20-1 1/2-1919-20	3	1 1/4	1 1/4	1 1/4	V	28	3	1/4	2	28	3	F	24	2 1/2	1/4	2	24	2 1/2	1/4	2	132	32
Huffman B-1 1/2-1919-20	3	1 1/4	1 1/4	1 1/4	V	22	2	1/4	2	22	2	F	24	2 1/2	1/4	2	24	2 1/2	1/4	2	144 1/2	34
Huffman C-1 1/2-1919-20	3	1 1/4	1 1/4	1 1/4	V	22	2	1/4	2	22	2	F	24	2 1/2	1/4	2	24	2 1/2	1/4	2	144 1/2	34
Hurlburt A1 1/2-2	3	1 1/4	1 1/4	1 1/4	V	28	3	1/4	2	28	3	F	24	2 1/2	1/4	2	24	2 1/2	1/4	2	144 1/2	34
Hurlburt B2 1/2	3	1 1/4	1 1/4	1 1/4	V	15	3	1/4	2	50	2 1/2	F	15	3	1/4	2	50	2 1/2	1/4	2	121	33
Hurlburt C3 1/2-4	3	1 1/4	1 1/4	1 1/4	V	15	3	1/4	2	50	2 1/2	F	15	3	1/4	2	50	2 1/2	1/4	2	145	33
Hurlburt D5-5 1/2	3	1 1/4	1 1/4	1 1/4	V	15	3	1/4	2	50	2 1/2	F	15	3	1/4	2	50	2 1/2	1/4	2	108	32
Huron-Erie 1 1/2	4	1 1/4	1 1/4	1 1/4	V	17	1 1/4	14	1 1/4	38 1/2	1 1/2	F	17 1/2	2	1/4	2	44	2	1/4	2	126	33
Huron-Michigan 2 1/2	4	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 5/8	1 1/2	F	51	2 1/4	1/4	2	51	2 1/4	1/4	2	138	33
Indiana 12-1 1/2-1920	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 5/8	1 1/2	F	56	2 1/2	1/4	2	56	2 1/2	1/4	2	144	34 1/2
Indiana 20-2-1920	3	1 1/4	1 1/4	1 1/4	V	10	1 1/4	17 1/2	1 1/4	26 5/8	1 1/2	F	68	3 1/2	1/4	2	68	3 1/2	1/4	2	156	37 1/2
Indiana 25-2 1/2-1920	3	1 1/4	1 1/4	1 1/4	V	9 3/4	2 1/4	17 3/4	2 1/4	30 1/4	1 1/4	F	38	2	1/4	2	36	2	1/4	2	90	34
Indiana 35-3 1/2-1920	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 5/8	1 1/2	F	43 3/4	2 1/4	1/4	2	43 3/4	2 1/4	1/4	2	88 1/2	34
Indiana 51-5-1920	3	1 1/4	1 1/4	1 1/4	V	6	1 1/4	13	1 1/4	26 5/8	1 1/2	F	43 3/4	2 1/4	1/4	2	43 3/4	2 1/4	1/4	2	91 1/2	34
International S-1500 lbs.—Speed Truck '21	3	1 1/4	1 1/4	1 1/4	V	9	2 1/4	14 1/2	2	32	1 1/2	F	50 5/8	2 1/4	1/4	2	50 5/8	2 1/4	1/4	2	118 1/2	34
International 21-2000 lbs.—1916-21	3	1 1/4	1 1/4	1 1/4	V	9	2 1/4	14 1/2	2	32	1 1/2	F	73 1/2	3 1/2	1/4	2	73 1/2	3 1/2	1/4	2	147 1/2	34
International 31-3000 lbs.—1916-21	3	1 1/4	1 1/4	1 1/4	V	13	1 3/4	15	1 3/4	33	1 1/4	F	58 1/2	3 1/2	1/4	2	58 1/2	3 1/2	1/4	2	150	36
International 41-4000 lbs.—1918-21	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 3/4	18	1 3/4	33 3/4	2	F	50	3	1/4	2	47	2	1 1/2	2	80	32
International 61-6000 lbs.—1918-21	4	1 1/4	1 1/4	1 1/4	V	12 1/2	1 3/4	18	1 3/4	33 3/4	2	F	48 1/2	2	1/4	2	47	2	1 1/2	2	120	32
International 101-10,000 lbs.—1920-21	4	1 1/4	1 1/4	1 1/4	V	12	2	10	1 1/4	33 1/4	1 1/4	F	48 1/2	2	1/4	2	47	2	1 1/2	2	120	32
Jackson B 3 1/2	3	1 1/4	1 1/4	1 1/4	V	12	2	10	1 1/4	33 1/4	1 1/4	F	49 3/4	3	1/4	2	47 1/2	2 1/2	1/4	2	116	34
J and J D-2-1920	3	1 1/4	1 1/4	1 1/4	V	12	2	10	1 1/4	33 1/4	1 1/4	F	49 3/4	3	1/4	2	47 1/2	2 1/2	1/4	2	116	34
Jumbo 15-1 1/2-1919	4	1 1/4	1 1/4	1 1/4	V	17 3/4	2	21 1/2	1 1/4	36 1/2	2	F	60 1/2	3	1/4	2	58 1/2	2 1/2	1/4	2	144	36
Jumbo 20-2-1919	4	1 1/4	1 1/4																			



## Replacement Table—Continued

Name, Model and Tonnage	ENGINE											BRAKE LINING								FRAME		
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Larrabee Deyo T--1918-19	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	6	1 1/4	36	1 1/4	F	72	3	1/4	2	72	3	1/4	2	157	36
L. M. C.-2 1/2--1919-20	3	1 1/4	1 1/4	1 1/4	V	10	1 1/2	14	1 1/4	35	1 1/4	F	55	3	1/4	2	50 1/2	2	1 1/4	2	143	32
Lombard 140 H.P.	6	1 1/4	1 1/4	1 1/4	V	10	1 1/2	14	1 1/4	35	1 1/4	F	55	3	1/4	2	50 1/2	2	1 1/4	2	120	79
Lombard 50 H.P.	4	1 1/4	1 1/4	1 1/4	V	9	1 1/4	5	1 1/4	1 1/2	1 1/2	F	53.4	2 1/2	1 1/4	2	38 1/2	2 1/2	1 1/4	2	79	64
Luedinghaus K2--1919-20	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	5	1 1/4	1 1/2	1 1/2	F	53.4	2 1/2	1 1/4	2	38 1/2	2 1/2	1 1/4	2	120 1/2	34
Luedinghaus K2-LS--1920	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	5	1 1/4	1 1/2	1 1/2	F	53.4	2 1/2	1 1/4	2	38 1/2	2 1/2	1 1/4	2	145 1/2	34
Luverne BBL-2	3	1 1/4	1 1/4	1 1/4	V	9	1 1/4	5	1 1/4	1 1/2	1 1/2	F	53.4	2 1/2	1 1/4	2	38 1/2	2 1/2	1 1/4	2	108	34
Maccar L-1 1/2--1915-20	3	1 1/4	1 1/4	1 1/4	V	3 1/4	1 1/2	10	1 1/4	30 3/4	3 1/4	F	11 1/2	3 1/4	1 1/4	4	11 1/2	3 1/4	1 1/4	4	128 1/2	34
Maccar H-2 1/2--1915-20	3	1 1/4	1 1/4	1 1/4	V	3 1/2	1 1/2	13	1 1/4	30 3/4	3 1/2	F	13	3 1/2	1 1/4	4	13	3 1/2	1 1/4	4	143 1/2	34
Maccar M2-3 1/2--1920	3	1 1/4	1 1/4	1 1/4	V	8	1 1/2	13 1/2	1 1/4	37 1/2	8	F	15 1/8	3 1/4	1 1/4	4	15 1/8	3 1/4	1 1/4	4	155 1/2	34
Maccar G-5--1919-20	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	20 1/2	2	40 3/4	2	F	17 3/4	4	1 1/4	4	17 3/4	4	1 1/4	4	167	37 1/2
Mack AB 1 1/2, 2-Ton-Chain '16-20	4	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	4 3/4	1 1/2	33	1 1/2	F	12 1/4	4	1 1/4	2	16 1/2	2 1/2	1 1/4	2	Opt	33 1/2
Mack Dual Reduction 1921	4	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	4 3/4	1 1/2	33	1 1/2	F	12 1/4	4	1 1/4	2	16 1/2	2 1/2	1 1/4	2	Opt	33 1/2
Mack AB-Tractor 5 Ton--16-20	4	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	4 3/4	1 1/2	33	1 1/2	F	12 1/4	4	1 1/4	2	16 1/2	2 1/2	1 1/4	2	77	37 1/2
Mack AC 3 1/2 to 7 1/2 ton--16-20	4	1 1/4	1 1/4	1 1/4	V	5 3/4	2 1/4	4 3/4	1 1/2	33	1 1/2	F	16 1/8	3	1 1/4	4	20 1/2	3 1/2	1 1/4	4	Opt	37 1/2
Mack AC Trac. 7 to 15 Ton--16-20	4	1 1/4	1 1/4	1 1/4	V	5 3/4	2 1/4	4 3/4	1 1/2	33	1 1/2	F	16 1/8	3	1 1/4	4	20 1/2	3 1/2	1 1/4	4	87	37 1/2
Master JI-1 1/2--1919-20	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	30 1/2	1	F	7 1/2	2 1/2	1 1/4	1	7 1/2	2 1/2	1 1/4	1	117 1/2	34 1/2
Master JW-1 1/2--1919-20	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	30 1/2	1	F	12	3 1/4	1 1/4	2	12	3 1/4	1 1/4	2	117 1/2	34 1/2
Master M-2 1/2--1916-20	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	7 1/2	2 1/2	1 1/4	1	7 1/2	2 1/2	1 1/4	1	117 1/2	34
Master O 2 1/2--1917-20	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	7 1/2	2 1/2	1 1/4	1	7 1/2	2 1/2	1 1/4	1	156 1/2	34
Master W-2 1/2--1916-20	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	13 1/2	3 1/2	1 1/4	2	13 1/2	3 1/2	1 1/4	2	117 1/2	34
Master WL 2 1/2--1917-20	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	13 1/2	3 1/2	1 1/4	2	13 1/2	3 1/2	1 1/4	2	156 1/2	34
Master D-2 1/2--1920	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	8 1/2	3 1/2	1 1/4	2	5 1/2	3 1/2	1 1/4	2	117 1/2	34
Master DL-2 1/2--1920	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	8 1/2	3 1/2	1 1/4	2	5 1/2	3 1/2	1 1/4	2	156 1/2	34
Master T-6 Tractor--1917-20	3	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	7 1/2	2 1/2	1 1/4	1	7 1/2	2 1/2	1 1/4	1	72 1/2	34
Master A-3 1/2--1918-20	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	16	3 1/4	1 1/4	2	16	3 1/4	1 1/4	2	147 1/2	36 1/2
Master AL-3 1/2--1918-20	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	16	3 1/4	1 1/4	2	16	3 1/4	1 1/4	2	183 1/2	36 1/2
Master E-3 1/2--1920	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	11	6	1 1/4	2	25	4	1 1/4	4	147 1/2	36 1/2
Master EL-3 1/2--1920	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/4	33	1 1/2	F	11	6	1 1/4	2	25	4	1 1/4	4	183 1/2	36 1/2
Master-B 5--1919-20	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/2	35	2	F	18	4	1 1/4	2	18	4	1 1/4	2	162 1/2	39
Master BL-5--1919-20	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/2	35	2	F	18	4	1 1/4	2	18	4	1 1/4	2	186 1/2	39
Master F-5--1920	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/2	35	2	F	11	6	1 1/4	2	25	4	1 1/4	4	162 1/2	39
Master FL-5--1920	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	15	1 1/2	35	2	F	11	6	1 1/4	2	25	4	1 1/4	4	186 1/2	39
Maxwell 1 1/2--1917-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	11	1 1/2	11	1 1/2	F	16	1 1/2	1 1/4	4	16	1 1/2	1 1/4	4	102	36
Menominee HT-1--1918-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	11	1 1/2	11	1 1/2	F	12	3 1/4	1 1/4	8	12	3 1/4	1 1/4	8	104	32
Menominee H-1 1/2--1916-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	11	1 1/2	11	1 1/2	F	13 1/2	3 1/4	1 1/4	8	13 1/2	3 1/4	1 1/4	8	122	32
Menominee D-2--1915-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	11	1 1/2	11	1 1/2	F	13 1/2	3 1/4	1 1/4	8	13 1/2	3 1/4	1 1/4	8	146	32
Menominee G-3 1/2--1916-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	11	1 1/2	11	1 1/2	F	16	3 1/4	1 1/4	8	16	3 1/4	1 1/4	8	149	36
Menominee J-5--1917-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	11	1 1/2	11	1 1/2	F	18 1/2	4	1 1/4	8	18 1/2	4	1 1/4	8	149	38
Menominee Ht-1--1920-late	3	1 1/4	1 1/4	1 1/4	V	9 1/4	1 1/2	10 1/2	1 1/4	33 1/2	1 1/4	F	47 1/2	2 1/2	1 1/4	2	33 1/2	2 1/2	1 1/4	2	102 1/2	32
Menominee H-1--1920-late	3	1 1/4	1 1/4	1 1/4	V	9 1/4	1 1/2	10 1/2	1 1/4	33 1/2	1 1/4	F	47 1/2	2 1/2	1 1/4	2	33 1/2	2 1/2	1 1/4	2	124	32
Menominee D-2--1920-late	3	1 1/4	1 1/4	1 1/4	V	3	1 1/2	3	1 1/2	37 1/2	2	F	57 1/2	2 1/2	1 1/4	2	42 1/2	2 1/2	1 1/4	2	131 1/2	32
Menominee G-3 1/2--1920-late	3	1 1/4	1 1/4	1 1/4	V	3	1 1/2	3	1 1/2	37 1/2	2	F	57 1/2	2 1/2	1 1/4	2	42 1/2	2 1/2	1 1/4	2	149	36
Menominee J-5--1920-late	3	1 1/4	1 1/4	1 1/4	V	3	1 1/2	3	1 1/2	40 3/4	2	F	69 1/2	3 1/2	1 1/4	2	52	2 1/2	1 1/4	2	149	38
Moreland 20N--1919-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	11	1 1/2	11	1 1/2	F	11	3	1 1/4	4	11	3	1 1/4	4	120	34
Moreland 20B-1 1/2--1919-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	11	1 1/2	11	1 1/2	F	12	3 1/4	1 1/4	4	12	3 1/4	1 1/4	4	132	34
Moreland 20C-2 1/2--1919-20	3	1 1/4	1 1/4	1 1/4	V	11	1 1/2	11	1 1/2	11	1 1/2	F	13 1/2	3 1/4	1 1/4	4						

## Replacement Table—Continued

Name, Model and Tonnage	ENGINE											BRAKE LINING								FRAME		
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length	Width
	No. per Cyl	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Patriot Revere-1	3	1 1/4	1 1/4	1 1/4	.....	7 3/4	2	8 3/4	2	38	1 1/4	F	41	1 1/4	1/4	2	41	1 1/4	1/4	2	92 1/2	33 1/4
Patriot Washington-3	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/2	12	1 1/2	38 1/2	2	F	55	2 1/4	1/4	2	55	2 1/4	1/4	2	150	34
Pierce Arrow-2-X-5	3	1 1/4	1 1/4	1 1/4	V	16 1/2	2	14 1/4	1 1/4	43 1/2	1 1/4	F	22 1/4	2 1/4	1/4	4	22 1/4	2 1/4	1/4	4	125 1/4	34 1/4
Pierce Arrow-3 1/2-W-2	3	1 1/4	1 1/4	1 1/4	V	11	2	15 1/2	1 1/4	43 1/2	1 1/4	F	9 1/4	6	1/4	2	18	4 1/4	1/4	4	133 1/4	38 1/4
Pierce Arrow-5-R-10	3	1 1/4	1 1/4	1 1/4	V	11	2	15 1/2	1 1/4	43 1/2	1 1/4	F	9 1/4	6	1/4	2	20 1/2	4 1/4	1/4	4	139 1/4	38 1/4
Pittsburgher 2 1/2—1919-20	3	1 1/4	1 1/4	1 1/4	V	6	1 1/2	12	1 1/2	37	1 1/4	F	52	2 1/4	1/4	2	52	2 1/4	1/4	2	136	33
Rainier R-8-2	3	1 1/4	1 1/4	1 1/4	V	5	1 1/2	13	1 1/2	31 1/2	1 1/4	F	44 1/2	2	1/4	1	44 1/2	2	1/4	1	.....	34
Rainier R6-1 1/2	3	1 1/4	1 1/4	1 1/4	V	9 1/4	1 1/2	14 1/4	1 1/2	41	1 1/4	F	19	2	1/4	2	19	2	1/4	2	113	34
Rainier R-19-1	3	1 1/4	1 1/4	1 1/4	V	8 1/2	1 1/2	14 1/4	1 1/2	41	1 1/4	F	19	2	1/4	2	19	2	1/4	2	100	34
Rainier R11-3/4	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	14 1/4	1 1/2	42	1 1/4	F	11 1/4	3	1/4	2	11 1/4	3	1/4	2	90	34
Reliance 10A-1 1/2—1920	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	13 1/2	1 1/2	35	2	F	17	2	1/4	4	17	2	1/4	4	122	32
Reliance 20B-2 1/2—1920	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	13 1/2	1 1/2	35	2	F	17	2	1/4	4	17	2	1/4	4	127	32
Reo F—1500-2500-lbs	3	1 1/4	1 1/4	1 1/4	V	5 1/2	1	5 1/2	1	39	1 1/4	F	43	2 1/4	1/4	1	39 1/2	2 1/4	1/4	1	82	30
Republic 10-1-10E-1-1919-20-21	3	1 1/4	1 1/4	1 1/4	V	12 1/2	2	6	2	40	1 1/4	F	20 1/4	2 1/4	1/4	4	19 1/4	2 1/4	1/4	4	98	34
Republic 11X-1 1/2—1919-20-21	3	1 1/4	1 1/4	1 1/4	V	12 1/2	2	6	2	40	1 1/4	F	54 1/4	2 1/4	1/4	2	24 1/4	2 1/4	1/4	4	118	34
Republic 19-2 1/2—1919-20-21	3	1 1/4	1 1/4	1 1/4	V	8	1 1/2	11 1/4	1 1/4	32	1 1/4	F	54 1/4	2 1/4	1/4	2	24 1/4	2 1/4	1/4	4	121	34
Republic 20-3 1/2—1919-20-21	3	1 1/4	1 1/4	1 1/4	V	7 1/4	1 1/2	11 1/4	1 1/4	36 1/4	1 1/2	F	55 1/4	3 1/4	1/4	2	30 1/4	4 1/4	1/4	1	146	37
Reynolds 3A-1 1/2	3	1 1/4	1 1/4	1 1/4	.....	7 1/4	1 1/2	11 1/4	1 1/4	36 1/4	1 1/2	.....	46	2	1/4	2	46	2	1/4	2	121	33
Reynolds 5A-2 1/2	3	1 1/4	1 1/4	1 1/4	.....	7 1/4	1 1/2	11 1/4	1 1/4	36 1/4	1 1/2	.....	52 1/4	2 1/4	1/4	2	52 1/4	2 1/4	1/4	2	126	33
Reynolds 7A-3 1/2	3	1 1/4	1 1/4	1 1/4	.....	7 1/4	1 1/2	11 1/4	1 1/4	36 1/4	1 1/2	.....	57	2 1/4	1/4	2	57	2 1/4	1/4	2	148	37
Reynolds 10A-5	3	1 1/4	1 1/4	1 1/4	.....	7 1/4	1 1/2	11 1/4	1 1/4	36 1/4	1 1/2	.....	70	3	1/4	2	70	3	1/4	2	148	37
Riker B3, BB-4	5	1 1/4	1 1/4	1 1/4	.....	10 1/2	1 1/2	10 1/2	1 1/2	32 1/2	1 1/4	F	7 1/4	4 1/4	1/4	2	20	4	1/4	4	150	38
Rowe CW-1 1/2—1918-19-20	3	1 1/4	1 1/4	1 1/4	.....	10 1/2	1 1/2	10 1/2	1 1/2	32 1/2	1 1/4	F	19	2	1/4	8	19	2	1/4	8	113	33
Rowe CDW2—1916-20	3	1 1/4	1 1/4	1 1/4	.....	10 1/2	1 1/2	10 1/2	1 1/2	32 1/2	1 1/4	F	45	2	1/4	4	45	2	1/4	4	123	33
Rowe GSW3—1918-20	3	1 1/4	1 1/4	1 1/4	.....	20	1 1/2	15 1/2	1 1/2	36 1/4	2	F	51 1/4	2 1/4	1/4	4	51 1/4	2 1/4	1/4	4	140	33
Rowe HW4—1918-20	3	1 1/4	1 1/4	1 1/4	.....	20	1 1/2	15 1/2	1 1/2	36 1/4	2	F	56 1/4	2 1/4	1/4	4	56 1/4	2 1/4	1/4	4	146	36
Rowe FW5—1914-20	3	1 1/4	1 1/4	1 1/4	.....	20	1 1/2	15 1/2	1 1/2	36 1/4	2	F	68	3	1/4	4	68	3	1/4	4	153	38 1/4
Rowe GPW3—1916-17, 1919-20	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	20	2	1/4	2	20	2	1/4	2	152	33
Sandow G-1—1918-20	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	20	2	1/4	2	20	2	1/4	2	96	34
Sandow CG-1 1/2—1918-20	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	20	2	1/4	2	20	2	1/4	2	120	34
Sandow I-2—1918-20	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	60	3	1/4	1	60	3	1/4	1	132	32
Sandow J-2 1/2—1918-20	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	13 1/2	3 1/2	1/4	2	16	3 1/2	1/4	2	144	32
Sandow L-5—1918-20	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	24	4 1/4	1/4	2	24	4 1/4	1/4	2	144	37
Sandow M-3 1/2—1918-20	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	18 1/4	4	1/4	2	18 1/4	4	1/4	2	144	37
Sanford 25-2 1/2—1917-20	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	51 1/4	2 1/4	1/4	2	51 1/4	2 1/4	1/4	2	144	35
Sanford W35-2 1/2—1917-20	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	56	2 1/4	1/4	2	56	2 1/4	1/4	2	145	35
Sanford W50-5—1917-20	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	69	3	1/4	2	69	3	1/4	2	145	35
Schacht 2	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	8 1/2	3 1/2	1/4	4	13 1/2	3	1/4	4	140	35 1/4
Schacht 2 1/2	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	8 1/2	3 1/2	1/4	4	13 1/2	3	1/4	4	140	35 1/4
Schacht 3 1/2	4	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	8 1/2	3 1/2	1/4	4	13 1/2	3	1/4	4	152	35 1/4
Schacht 5	4	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	6	1 1/4	36 1/4	1 1/4	.....	8 1/2	3 1/2	1/4	4	15	4	1/4	4	152	35 1/4
Selden 1 1/2 A—1919-20	3	1 1/4	1 1/4	1 1/4	.....	12	2	11 1/4	1 1/4	41	1 1/4	F	11 1/4	3 1/4	1/4	2	11 1/4	3 1/4	1/4	4	114	34
Selden 2 1/2 A—1920	3	1 1/4	1 1/4	1 1/4	.....	3 3/4	2	12	1 1/4	31	1 1/2	F	13 1/4	3 1/4	1/4	2	13 1/4	3 1/4	1/4	4	134	34
Selden 3 1/2 A—1919-20	3	1 1/4	1 1/4	1 1/4	.....	9	1 1/2	5 1/2	2	34 1/4	2	F	15 1/4	3 1/4	1/4	2	15 1/4	3 1/4	1/4	4	153	37 1/4
Selden 5 A—1920	3	1 1/4	1 1/4	1 1/4	.....	7	2	20 1/2	2	40 1/2	2	F	18	4	1/4	2	18	4	1/4	4	153	37 1/4
Service 15-1921	3	1 1/4	1 1/4	1 1/4	.....	10	1 1/4	2	1 1/4	35	2 1/2	F	12	3 1/4	1/4	2	12	3 1/4	1/4	2	187 1/4	37 1/4
Service 220-1—1919-20	3	1 1/4	1 1/4	1 1/4	.....	10	2	6	1 1/4	37 1/4	1	F	12	3 1/4	1/4	2	12	3 1/4	1/4	2	109 1/4	34
Service 31-1 1/2—1919-20	4	1 1/4	1 1/4	1 1/4	.....	10	2	8	1 1/4	33	1 1/4	F	12	3 1/4	1/4	2	12	3 1/4	1/4	2	121	34
Service 36-1 1/2—1919-20	4	1 1/4	1 1/4	1 1/4	.....	10	2	8	1 1/4	33	1											



## Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service				Emergency			Length	Width			
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Traffic C-4000—1919-20.....	3	1 1/4	1 1/4	1 1/4	H	10 1/2	2	10 1/2	2	41 1/4	1 1/4	F	43 1/2	2 1/2	1 1/4	2	38	1 3/4	1 1/4	2	120 3/4	42
Transport 20-1.....	3	1 1/4	1 1/4	1 1/4	V	12	2	12	2	36 1/2	1 1/4	F	48 1/2	2 1/2	1 1/4	2	45 7/8	1 1/2	1 1/4	2	101	34
Transport 30-1 1/2.....	3	1 1/4	1 1/4	1 1/4	V	10 3/4	2	13	2	40 3/8	1 1/4	F	48 1/2	2 1/2	1 1/4	2	45 7/8	1 1/2	1 1/4	2	117	34
Transport 50-2 1/2.....	3	1 1/4	1 1/4	1 1/4	V	9 1/4	2	10	1 1/4	32 3/4	1 1/4	F	50 3/4	2 1/2	1 1/4	2	48 1/2	2 1/4	1 1/4	2	123	34
Transport 70-3 1/2.....	4	1 1/4	1 1/4	1 1/4	V	12	2	16	1 1/4	35 7/8	1 1/4	F	51 1/2	2 1/2	1 1/4	2	58	2 1/4	1 1/4	2	150	36 1/2
Traylor B-1 1/2.....	3	1 1/4	1 1/4	1 1/4	V	12	2	16	1 1/4	33	1	F	50	2 1/2	1 1/4	2	50	2 1/4	1 1/4	2	117	34
Traylor C-2.....	3	1 1/4	1 1/4	1 1/4	V	12	2	16	1 1/4	33	1	F	50	2 1/2	1 1/4	2	50	2 1/4	1 1/4	2	120	34
Traylor D-3.....	3	1 1/4	1 1/4	1 1/4	V	12	2	16	1 1/4	33	1	F	56 1/2	2 1/4	1 1/4	2	56 1/2	2 1/4	1 1/4	2	142	34
Triangle AA-3/4—1920.....	3	1 1/4	1 1/4	1 1/4	H	17	3	17	3	34	1	F	22	7	1 1/4	1	41	1 1/4	1 1/4	2	94	34
Triangle A-1 1/2—1918-20.....	3	1 1/4	1 1/4	1 1/4	V	14	1 1/4	14 1/2	1 1/4	43	1 1/4	F	7	4	1 1/4	2	49	2 1/4	1 1/4	2	126	34
Triangle B-2 1/2—1919-20.....	3	1 1/4	1 1/4	1 1/4	V	18	1 1/2	18	1 1/2	40	1 1/2	F	7	4	1 1/2	2	52	2 1/4	1 1/4	2	132	34
Triangle C-2—1920.....	3	1 1/4	1 1/4	1 1/4	V	14	1 1/4	14 1/2	1 1/4	43	1 1/4	F	7	4	1 1/4	2	52	2 1/4	1 1/4	2	129	34
Triumph H-1 1/2.....	4	1 1/4	1 1/4	1 1/4	V	9	1 1/4	17	1 1/4	32 1/2	1 1/4	F	42	2 1/2	1 1/4	2	38	1 3/4	1 1/4	2	120	34 1/2
Triumph HB-2.....	4	1 1/4	1 1/4	1 1/4	V	9	1 1/4	17	1 1/4	32 1/2	1 1/4	F	46	2 1/2	1 1/4	2	32	2 1/4	1 1/4	2	120	34 1/2
Triumph HC-1 1/2.....	4	1 1/4	1 1/4	1 1/4	V	9	1 1/4	17	1 1/4	32 1/2	1 1/4	F	46	2 1/2	1 1/4	2	32	2 1/4	1 1/4	2	120	34 1/2
Twin City 2.....	3	1 1/4	1 1/4	1 1/4	V	11	2	13	1 1/4	36 3/4	1 1/4	F	50	2 1/2	1 1/4	1	48	2 1/4	1 1/4	1	132	33
Twin City 3 1/2.....	4	1 1/4	1 1/4	1 1/4	V	8	1 1/4	14	1 1/4	36 1/2	1 1/4	F	15	3 3/4	1 1/4	2	15	3 3/4	1 1/4	2	156	36
Ultimate A-2—1920.....	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	45	2 1/2	1 1/4	2	45	2 1/2	1 1/4	2	126	32 1/2
Ultimate AJ2—1920.....	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	45	2 1/2	1 1/4	2	45	2 1/2	1 1/4	2	126	32 1/2
Ultimate AJL-2—1920.....	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	45	2 1/2	1 1/4	2	45	2 1/2	1 1/4	2	150	32 1/2
Ultimate B-3—1920.....	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	51	2 1/2	1 1/4	2	51	2 1/2	1 1/4	2	144	32 1/2
Ultimate BL3—1920.....	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	51	2 1/2	1 1/4	2	51	2 1/2	1 1/4	2	192	32 1/2
Union F-2 1/2.....	3	1 1/4	1 1/4	1 1/4	V	20	1 1/4	19 1/2	1 1/4	37 3/4	1 1/4	F	55	3 1/2	1 1/4	1	50	3 1/2	1 1/4	1	133 1/2	32
Union H-4.....	3	1 1/4	1 1/4	1 1/4	V	20	1 1/4	19 1/2	1 1/4	37 3/4	1 1/4	F	56 3/4	3 1/2	1 1/4	1	32	4 1/4	1 1/4	1	157 1/2	34
United 1 1/2.....	3	1 1/4	1 1/4	1 1/4	V	15	2 1/2	16	1 1/2	37 1/2	1 1/4	F	48	3	1 1/4	1	48	1 1/2	1 1/4	1	120	33
United 2 1/2.....	3	1 1/4	1 1/4	1 1/4	V	7	2 1/2	12	1 1/2	37 1/2	1 1/4	F	49	3	1 1/4	1	49	2 1/2	1 1/4	1	Opt	33
United 3 1/2.....	3	1 1/4	1 1/4	1 1/4	V	7	2 1/2	12	1 1/2	37 1/2	1 1/4	F	62	3	1 1/4	1	58	2 1/2	1 1/4	1	Opt	34
United 5.....	3	1 1/4	1 1/4	1 1/4	V	14 1/2	2 1/2	12	1 1/2	37 1/2	1 1/4	F	88 1/2	2 1/4	1 1/4	1	88 1/2	2 1/4	1 1/4	1	Opt	38
U.S.N.-1 1/2.....	3	1 1/4	1 1/4	1 1/4	H	11 1/2	2	9	1 1/4	37	1 1/4	F	50	2 1/2	1 1/4	2	46 1/2	1 1/4	1 1/4	2	120	34
U.S.R.-2 1/2-3.....	3	1 1/4	1 1/4	1 1/4	V	10	1 1/4	9	1 1/4	35	1 1/4	F	46	2 1/2	1 1/4	2	46	2 1/2	1 1/4	2	144	34
U.S.S.-3 1/2-4.....	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	8	1 1/4	37	1 1/4	F	50	2 1/2	1 1/4	2	50	2 1/2	1 1/4	2	156	36
U.S.T.-5-6.....	3	1 1/4	1 1/4	1 1/4	V	15	2	13	1 1/2	38 3/4	2	F	62	3 1/2	1 1/4	4	33	4 1/4	1 1/4	1	168	36
Velie 46-1 1/2—1921.....	3	1 1/4	1 1/4	1 1/4	V	9 1/2	2 1/4	12 1/4	1 1/2	40	1	V	54	2 1/2	1 1/4	2	52 1/2	2 1/4	1 1/4	2	120	31
Vim 29-1 1/2.....	3	1 1/4	1 1/4	1 1/4	V	14 1/2	1 1/2	11	1 1/2	30	1	F	14 1/2	1 1/2	1 1/4	4	14 1/2	1 1/2	1 1/4	4	64	30
Vim 30-1 1/2.....	3	1 1/4	1 1/4	1 1/4	V	14 1/2	1 1/2	11	1 1/2	30	1	F	14 1/2	1 1/2	1 1/4	4	14 1/2	1 1/2	1 1/4	4	83 1/2	30
Vim 31-1.....	4	1 1/4	1 1/4	1 1/4	V	19	2	19	2	40	1	F	19	2	1 1/4	4	19	2	1 1/4	4	92	32
Vim 22-2.....	4	1 1/4	1 1/4	1 1/4	V	40	1	40	1	40	1	F	44 1/2	2	1 1/4	2	44 1/2	2	1 1/4	2	121 1/4	34
Vim 23-3.....	5	1 1/4	1 1/4	1 1/4	V	51 1/2	2 1/4	51 1/2	2 1/4	51 1/2	2 1/4	F	51 1/2	2 1/4	1 1/4	2	51 1/2	2 1/4	1 1/4	2	159 1/2	34
Walker M 1/2.....	3	1 1/4	1 1/4	1 1/4	V	43	2 1/2	43	2 1/2	43	2 1/2	F	43	2 1/2	1 1/4	2	14	1 1/4	1 1/4	4	90	32
Walker K1.....	3	1 1/4	1 1/4	1 1/4	V	45 1/2	2 1/2	45 1/2	2 1/2	45 1/2	2 1/2	F	45 1/2	2 1/2	1 1/4	2	16	1 1/4	1 1/4	4	96	32
Walker L2.....	3	1 1/4	1 1/4	1 1/4	V	53 1/4	3 1/2	53 1/4	3 1/2	53 1/4	3 1/2	F	53 1/4	3 1/2	1 1/4	2	19	2 1/4	1 1/4	4	120	32
Walker P3 1/2.....	3	1 1/4	1 1/4	1 1/4	V	53 1/4	3 1/2	53 1/4	3 1/2	53 1/4	3 1/2	F	53 1/4	3 1/2	1 1/4	2	19 1/4	2 1/4	1 1/4	4	140	35
Walker N5.....	3	1 1/4	1 1/4	1 1/4	V	53 1/4	3 1/2	53 1/4	3 1/2	53 1/4	3 1/2	F	53 1/4	3 1/2	1 1/4	2	19 1/4	2 1/4	1 1/4	4	162	35
W.J.-B2 1/2.....	4	1 1/4	1 1/4	1 1/4	V	13	3 1/2	13	3 1/2	13	3 1/2	F	13	3 1/2	1 1/4	4	13	3 1/2	1 1/4	4	133	32 1/2
Walter S-5.....	3	1 1/4	1 1/4	1 1/4	V	10	1 1/2	18	1 1/2	39	1 1/2	F	15	5	1 1/4	4	57	2 1/4	1 1/4	2	150	36
Ward LaFrance 2B-2 1/2—1920.....	3	1 1/4	1 1/4	1 1/4	V	7	1 1/2	16	1 1/2	41 1/2	1 1/2	F	13	3 1/2	1 1/4	4	13	3 1/2	1 1/4	4	136	33
Ward LaFrance 4A-3 1/2—1920.....	3	1 1/4	1 1/4	1 1/4	V	8 1/2	1 1/2	18	1 1/2	41 1/2	1 1/2	F	15 1/2	3 1/2	1 1/4	4	15 1/2	3 1/2	1 1/4	4	170 1/2	37
Ward LaFrance 5A-5—1920.....	3	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	18	1 1/2	41 1/2	1 1/2	F	18	4	1 1/4	4	18	4	1 1/4	4	170 1/2	37
Ward WS2.....	3	1 1/4	1 1/4	1 1/4	V	14 1/2	1 1/2	14 1/2	1 1/2	14 1/2	1 1/2	F	14 1/2	1 1/2	1 1/4	8	14 1/2	1 1/2	1 1/4			

# KEY OF ABBREVIATIONS

Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Page Following. In All Specifications—O, Own; Op or Opt, Optional

1

Beaver  
Cont-Continental  
GBS—Golden, Belknap &  
Gr-B—Gray-Beal [Swartz  
Her-Hercules  
Hig-Highway  
Hin-Hinkley  
HSP—Herschell-Spillman  
LeR—Le Roi  
Lib-Liberty  
LMF—Light Mfg. & Fdy.  
Lyc—Lycoming  
Mid—Midwest  
Rut—Rutenber  
Ster—Sterling  
Sup—Supreme  
TC—Twin City  
Vict—Victory  
Wau—Waukesha  
Wei—Weidely  
Wis—Wisconsin

Valve Arrangement:

H—Overhead  
L—ELL-Head  
T—TEE-Head  
S—Sleeve

2

How Cooled:

A—Air  
B—Pump & Thermo  
C—Centrifugal  
G—Gear Pump  
T—Thermo-Syphon

3

Radiator (Make):

BW—B & W  
Brm—Brenem  
Bus—Bush  
Can—Candler  
Chic—Chicago  
EM—English-Mersick  
Eur—Eureka  
Fed—Fedders  
Flex—Flexo  
GO—G. & O.  
Har—Harrison  
Hoo—Hooven  
Idl—Ideal  
Jam—Jamestown  
Kue—Kuenz  
Liv—Livingston  
Lug—Long  
McC—McCord  
May—Mayo  
Mod—Modine  
Per—Perflex  
R-T—Rome-Turnev  
S-W—Sparks-Withington  
Spar—Spartan  
Spec—Special  
Spli—Splitex  
Stan—Standard

5

Radiator (Type):

C—Cellular  
H—Honeycomb

6

Lubrication:  
FS—Force and Splash  
F—Force Feed  
S—Splash  
Carburetor:  
B&B—Ball & Ball  
Bent—Bennett  
Cart—Carter  
Eag—Eagle  
Eng—Ensign  
Fich—Fletcher  
Holl—Holley  
John—Johnson  
King—Kingston  
Mar—Marvel  
Mas—Master  
Mill—Miller  
Rayf—Rayfield  
Scoe—Scoe  
Strm—Stromberg  
Shk—Shakespeare  
Sheb—Schebler  
Stew—Stewart  
Till—Tillotson  
Zen—Zenith

7

Fuel Feed:  
G—Gravity  
P—Pressure  
V—Vacuum

8

Governor:  
Con—Continental  
Del—Delaney  
Dup—Duplex  
Hin—Hinkley  
Mer—Merrill  
McC—McCanna  
Mon—Monarch  
Phar—Pharo  
Pier—Pierce  
Rug—Ruggles  
Sim—Simplex  
Wau—Waukesha

9

Clutch (Make):  
B. B.—Borg & Beck  
B. Li.—Brown-Lipe  
Covt.—Covert  
Det.—Detlaiff  
Full.—Fuller  
D. G.—Detroit Gear & Mach.  
Hart—Hartford  
HS—Hele-Shaw  
M-E—Merchant & Evans  
Munc.—Muncie  
M-P—Muncie Products  
T-D—Twin Disc  
W-C—Warner Corporation  
W-Gr—Warner Gear

10

Clutch (Type):  
D—Disc  
C—Cone  
DP—Dry Plate  
WP—Wet Plate

11

Clutch (Type):  
D—Disc  
C—Cone  
DP—Dry Plate  
WP—Wet Plate

12

Ignition System:  
Amr—American Swiss  
AtK—Atwater-Kent  
Aut—Auto-Lite  
Bos—Bosch  
Ber—Berling  
Con—Connecticut  
Del—Delco  
Eis—Eisemann  
Exi—Exide  
Kin—Kingston  
KW—K. W. Ignition Co.  
Lor—Lorraine  
NE—North East  
POL—Prest-O-Lite  
Rm—Remy  
Sim—Simms  
Spl—Splitdorf  
Wag—Wagner  
Wes—Westinghouse  
Engine Starter:  
AC—Allis-Chalmers  
AL—Auto-Lite  
Bj—Bijur  
DL—Delco  
Dy—Dyneto  
GD—Gray & Davis  
LN—Leece-Neville  
NE—North East  
RE—Remy  
Wg—Wagner  
USL—U. S. L.  
W—Westinghouse

13

Gearset:  
B-Li.—Brown-Lipe  
Cott—Cotta  
Covt.—Covert  
D-Sea—Driggs-Seabury  
Det—Detroit  
Dun—Dundore  
Durst—Durstion  
Full—Fuller  
G-Le—Grant Lees  
M-M—Mechanics Mach. Co  
Munc—Muncie  
M-P—Muncie Products  
Rock—Rockford  
W-C—Warner Corporation  
W-Gr—Warner Gear

14

Location of Gearset:  
A—Amidships  
R—Rear  
U—Unit with engine  
J—Unit with jackshaft

15

Universal:  
A-B—Easton Mch. Co.  
Acm—Acme  
Arv—Arvac  
Bear—Bearings Co.  
Bid—Blood Brothers  
Det—Detroit  
Dit—Ditwiler

16

Universal:  
A-B—Easton Mch. Co.  
Acm—Acme  
Arv—Arvac  
Bear—Bearings Co.  
Bid—Blood Brothers  
Det—Detroit  
Dit—Ditwiler

Spring:  
Am—Am. Auto Parts  
Bea—Beans  
Cham—Champion  
Coop—Cooper  
Del—Delany  
Det—Detroit  
GC—Garden City  
Har—Harvey  
Hig—Higgins  
IC—Iron City  
Jax—Jaxon  
Kal—Kalamazoo  
Lah—Laher  
Lig—Liggett  
Mar—Maremont  
Math—Mather  
Mer—Merrill  
Nat—National  
Pen—Penn  
Per—Perfection  
Row—Rowland  
Shel—Sheldon  
SP—Spring Perch  
Stan—Stan-Par  
Ster—Sterling  
Tem—Temme  
Tut—Tuthill  
US—United States  
Wis—Wisconsin

Final Drive:  
B—Bevel Gear  
C—Chain  
I—Internal Gear  
N—Concentric Spur  
P—Spur  
R—Double Reduction  
S—Spiral Bevel  
W—Worm

18

Final Drive:  
B—Bevel Gear  
C—Chain  
I—Internal Gear  
N—Concentric Spur  
P—Spur  
R—Double Reduction  
S—Spiral Bevel  
W—Worm

19

Rear Axle (Make):  
Amr—American  
Badg—Badger  
Col—Columbia  
Stan—Chicago  
Cl—Clark  
Dun—Dunkirk  
Eat—Eaton, Stan-Par  
Hind—Hindley  
Ir-M—Iron Mt.  
Keno—Kenosha  
Ken—Kennedy

Rock—Rockford  
Russ—Russell  
Sals—Salisbury  
Sav—Savage  
Shel—Sheldon  
Thom—Thomson  
Tim—Timken  
Torb—Torbensen  
W-M—Weston-Mott  
US—United States  
Walk—Walker  
Wis—Wisconsin

Rear Axle (Type):  
Flot—Floating  
1/2-Fl—Semi-Floating  
3/4-Fl—3/4-Floating  
D—Dead

Steering Gear:  
CAS—C. A. S. Products Co.  
Dit—Ditwiler  
Gen—Gemmer  
Jac—Jacox  
Lav—Lavine  
M-P—Muncie Products  
Ros—Ross  
W-C—Warner Corporation  
Woh—Wohlrab

21

Steering Gear:  
CAS—C. A. S. Products Co.  
Dit—Ditwiler  
Gen—Gemmer  
Jac—Jacox  
Lav—Lavine  
M-P—Muncie Products  
Ros—Ross  
W-C—Warner Corporation  
Woh—Wohlrab

Wheels:

Arc—Archibald  
AuW—Auto Wheel  
Bim—Bimel  
Cla—Clark  
C-M—Crane & McMahon  
Day—Dayton  
Det—Detroit  
E-O—Eberly & Oris  
Hay—Haynes  
Hoo—Hoopes Brothers  
Jon—Jones  
Kel—Kelsey  
Mot—Motor Wheel  
Mut—Mutual  
Nor—Northern  
Pri—Prudden  
Roy—Royer  
Rus—Russell  
Sal—Salisbury  
Sch—Schwartz  
Smi—Smith  
Sta—Stanwell  
StM—St. Mary  
Stn—Standard  
Wal—Walker  
Wan—Wayne  
W-L—Waterhouse & Lester  
Wes—Western Wheel Co

22

Wheels:  
Arc—Archibald  
AuW—Auto Wheel  
Bim—Bimel  
Cla—Clark  
C-M—Crane & McMahon  
Day—Dayton  
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Roy—Royer  
Rus—Russell  
Sal—Salisbury  
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Smi—Smith  
Sta—Stanwell  
StM—St. Mary  
Stn—Standard  
Wal—Walker  
Wan—Wayne  
W-L—Waterhouse & Lester  
Wes—Western Wheel Co

Rim Equipment:  
Bak—Baker  
Det—Detroit  
Fir—Firestone  
Gdy—Goodyear  
Jax—Jaxon  
Kel—Kelsey  
Stn—Stanwell

23

Rim Equipment:  
Bak—Baker  
Det—Detroit  
Fir—Firestone  
Gdy—Goodyear  
Jax—Jaxon  
Kel—Kelsey  
Stn—Stanwell

MAY 15, 1921

THE COMMERCIAL CAR JOURNAL

55





Ford T	1495	1850	2100	2400	2700	3000	3300	3600	3900	4200	4500	4800	5100	5400	5700	6000	6300	6600	6900	7200	7500	7800	8100	8400	8700	9000	9300	9600	9900	10200	10500	10800	11100	11400	11700	12000	12300	12600	12900	13200	13500	13800	14100	14400	14700	15000	15300	15600	15900	16200	16500	16800	17100	17400	17700	18000	18300	18600	18900	19200	19500	19800	20100	20400	20700	21000	21300	21600	21900	22200	22500	22800	23100	23400	23700	24000	24300	24600	24900	25200	25500	25800	26100	26400	26700	27000	27300	27600	27900	28200	28500	28800	29100	29400	29700	30000	30300	30600	30900	31200	31500	31800	32100	32400	32700	33000	33300	33600	33900	34200	34500	34800	35100	35400	35700	36000	36300	36600	36900	37200	37500	37800	38100	38400	38700	39000	39300	39600	39900	40200	40500	40800	41100	41400	41700	42000	42300	42600	42900	43200	43500	43800	44100	44400	44700	45000	45300	45600	45900	46200	46500	46800	47100	47400	47700	48000	48300	48600	48900	49200	49500	49800	50100	50400	50700	51000	51300	51600	51900	52200	52500	52800	53100	53400	53700	54000	54300	54600	54900	55200	55500	55800	56100	56400	56700	57000	57300	57600	57900	58200	58500	58800	59100	59400	59700	60000	60300	60600	60900	61200	61500	61800	62100	62400	62700	63000	63300	63600	63900	64200	64500	64800	65100	65400	65700	66000	66300	66600	66900	67200	67500	67800	68100	68400	68700	69000	69300	69600	69900	70200	70500	70800	71100	71400	71700	72000	72300	72600	72900	73200	73500	73800	74100	74400	74700	75000	75300	75600	75900	76200	76500	76800	77100	77400	77700	78000	78300	78600	78900	79200	79500	79800	80100	80400	80700	81000	81300	81600	81900	82200	82500	82800	83100	83400	83700	84000	84300	84600	84900	85200	85500	85800	86100	86400	86700	87000	87300	87600	87900	88200	88500	88800	89100	89400	89700	90000	90300	90600	90900	91200	91500	91800	92100	92400	92700	93000	93300	93600	93900	94200	94500	94800	95100	95400	95700	96000	96300	96600	96900	97200	97500	97800	98100	98400	98700	99000	99300	99600	99900	100200	100500	100800	101100	101400	101700	102000	102300	102600	102900	103200	103500	103800	104100	104400	104700	105000	105300	105600	105900	106200	106500	106800	107100	107400	107700	108000	108300	108600	108900	109200	109500	109800	110100	110400	110700	111000	111300	111600	111900	112200	112500	112800	113100	113400	113700	114000	114300	114600	114900	115200	115500	115800	116100	116400	116700	117000	117300	117600	117900	118200	118500	118800	119100	119400	119700	120000	120300	120600	120900	121200	121500	121800	122100	122400	122700	123000	123300	123600	123900	124200	124500	124800	125100	125400	125700	126000	126300	126600	126900	127200	127500	127800	128100	128400	128700	129000	129300	129600	129900	130200	130500	130800	131100	131400	131700	132000	132300	132600	132900	133200	133500	133800	134100	134400	134700	135000	135300	135600	135900	136200	136500	136800	137100	137400	137700	138000	138300	138600	138900	139200	139500	139800	140100	140400	140700	141000	141300	141600	141900	142200	142500	142800	143100	143400	143700	144000	144300	144600	144900	145200	145500	145800	146100	146400	146700	147000	147300	147600	147900	148200	148500	148800	149100	149400	149700	150000	150300	150600	150900	151200	151500	151800	152100	152400	152700	153000	153300	153600	153900	154200	154500	154800	155100	155400	155700	156000	156300	156600	156900	157200	157500	157800	158100	158400	158700	159000	159300	159600	159900	160200	160500	160800	161100	161400	161700	162000	162300	162600	162900	163200	163500	163800	164100	164400	164700	165000	165300	165600	165900	166200	166500	166800	167100	167400	167700	168000	168300	168600	168900	169200	169500	169800	170100	170400	170700	171000	171300	171600	171900	172200	172500	172800	173100	173400	173700	174000	174300	174600	174900	175200	175500	175800	176100	176400	176700	177000	177300	177600	177900	178200	178500	178800	179100	179400	179700	180000	180300	180600	180900	181200	181500	181800	182100	182400	182700	183000	183300	183600	183900	184200	184500	184800	185100	185400	185700	186000	186300	186600	186900	187200	187500	187800	188100	188400	188700	189000	189300	189600	189900	190200	190500	190800	191100	191400	191700	192000	192300	192600	192900	193200	193500	193800	194100	194400	194700	195000	195300	195600	195900	196200	196500	196800	197100	197400	197700	198000	198300	198600	198900	199200	199500	199800	200100	200400	200700	201000	201300	201600	201900	202200	202500	202800	203100	203400	203700	204000	204300	204600	204900	205200	205500	205800	206100	206400	206700	207000	207300	207600	207900	208200	208500	208800	209100	209400	209700	210000	210300	210600	210900	211200	211500	211800	212100	212400	212700	213000	213300	213600	213900	214200	214500	214800	215100	215400	215700	216000	216300	216600	216900	217200	217500	217800	218100	218400	218700	219000	219300	219600	219900	220200	220500	220800	221100	221400	221700	222000	222300	222600	222900	223200	223500	223800	224100	224400	224700	225000	225300	225600	225900	226200	226500	226800	227100	227400	227700	228000	228300	228600	228900	229200	229500	229800	230100	230400	230700	2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Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		Universal (Make)		Spring (Make)		Rear Axle		Total Gear Ratio		Steering Gear (Make)		Tires, Wheels, Rims		Chassis Weight	Wheelbase	P. Cent of Weight on Rear Wheels
		Make and Model	Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Caburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Location	Speeds	Total Gear Ratio	duction in Low	Steering Gear (Make)	Front	Rear			
1 1/2 Ton—Con'd																												
Erie 1 1/2	3000	Buda-WU	3 1/2 x 5	22.5	17	PT	McC	McC	PT	FS	Strm	V	Pier	Full	DD	Bos	Op	Full	Full	U	4	59.5	Ros	34 x 3 1/2	36 x 5	Hoo	22	4700 144 80
Fagel 1 1/2	2725	Wau-BUX	3 1/2 x 5 1/4	27.2	17	PT	Mod	Mod	PT	FS	Zen	V	Phar	Det	DD	Eis	Op	Full	Full	U	4	59.5	Ros	34 x 3 1/2	34 x 5	Pia	23	4300 136 80
Federal A. X.	2800	Cont N	3 1/2 x 5 1/4	19.6	17	PT	Mod	Mod	PT	FS	Zen	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	37.4	Ros	36 x 5 1/2	36 x 5	Sun		4050 144 68.5
Frontier A. X.	2550	Buda CTU	3 1/2 x 5 1/4	22.5	17	PT	EM	EM	PT	FS	Zen	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3670 120 55
Gary Drive C.	3100	Buda ITU	4 x 5 1/4	25.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3200 0p 55
Gent 15A	2425	Cont N	3 1/2 x 5	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3300 144 68
Graham Bros Speed Truck	2495	Cont N	3 1/2 x 5	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		2850 142 70
Gramm Bernstein 15	2050	Cont N	3 1/2 x 5	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3800 138 90.5
Gramm Bernstein 65	2725	Cont N	3 1/2 x 5	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4200 138 90.5
G. W. W. Farm Spec.	2100	Wei	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3200 142 65
Hahn CD	2550	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4800 130 65
Harvey WEA	2550	Buda OU	4 1/2 x 5 1/4	27.2	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3550 128 80
Hawkeye K	2365	Buda QU	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3800 138 90.5
Hewitt-Ludlow	2550	Buda CTU	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4200 138 90.5
Higraide B20	2550	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3750 148 70
H. R. L. R.	3250	Hink HAA	4 x 5 1/4	25.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3100 130 66
Huffman B.	1795	Buda WU	3 1/2 x 5	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4560 144 66
Hufman C.	1795	Buda WU	3 1/2 x 5	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3200 140 85
Hurlburt	2550	Buda IU	4 x 5 1/4	25.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3350 140 85
Huron-Erie	2040	Buda CTU	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4300 148 85
Independent G (low)	2040	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3550 135 75
Independent F (Ohio)	2585	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3400 140 85
* International 31	2050	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3000 128 55
Jumbo 15	2425	Buda CTU	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4530 144 75
Kalamazoo G.	3100	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		5080 144 80
Keating 1 1/2	2900	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3400 136 60
Kelly-Springfield K31	2775	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4420 144 89
Kelly-Springfield K34	2900	Own	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4670 144 89
Kiesel General Utility	2775	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		5000 152 70.5
* Kleber A.	3100	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		5200 143 75
Kleber D.	2285	H-Sp	3 1/2 x 5	19.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3600 137 70
Kornbe-Deyo U	2400	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3600 138
Lueninghaus W	2700	Wau BUX	3 1/2 x 5 1/4	27.2	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4100 144 75
Macfar 1 1/2	2925	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4150 150 80
Mack AB 1 1/2	3450	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4900 Op 68
Mack AB 1 1/2	3500	Own	3 1/2 x 5 1/4	25.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4900 Op 68
Master JW	2690	Buda OU	4 1/2 x 5 1/4	27.2	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3900 142 78
Maxwell	1497	Own	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		2385 124 50
Memomine H.	2275	Wia EAU	4 x 5	25.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		144 80
* Moline 10	2450	Own NT	3 1/2 x 5 1/4	19.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		130
* Moline 21B	3125	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4150 126
Napoleon 11	1860	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4150 126
Nelson-LeMoon F 1 1/2	2025	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3450 133 65
Noble-B30	2250	Buda CTU	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3450 133 65
Nelson-B30	2250	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3450 133 65
Normal	2285	Lyco K	3 1/2 x 5 1/4	19.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3400 140 80
Normal 35 E Special	2285	Buda CTU	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3400 140 80
* Oden A1	2550	Buda ITU	4 x 5 1/4	25.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3500 150 43
* Old Reliable A.	2015	Wia EU	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		3400 136 70
* Onitida B.	2880	Her HAA400	4 x 5 1/4	25.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		5025 144
Orleans A.	2880	Her HAA400	4 x 5 1/4	25.6	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		5025 144
Paige E2-19	2550	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4000 140 85
Pacer F	2550	Cont N	3 1/2 x 5 1/4	22.5	17	PT	Idl	Idl	PT	FS	Strm	G	Mon	Full	DD	Spl	Op	Full	Full	U	4	32.1	Ros	36 x 5 1/2	36 x 5	Sun		4000

[illegible]

Chassis only





†Chassis Only



Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		REAR AXLE		STEERING GEAR		TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	P.R. Cent of Weight on Rear Wheels						
		Make and Model	Bore and Stroke	N. A. C. C. Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Type	Total Gear Reduction in High				Total Gear Reduction in Low	Steering Gear (Make)	Wheels (Make)		Rim Equipment	
																									Speeds	Location		Final Drive
1																												
Buda HTU	3850	Own	4 1/2 x 5 1/2	28.9 L	C	Own	Fin	Fin	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	5500	178 7/2	72
U. S. R.	3950	Her MU2	4 1/2 x 5 1/2	28.9 L	C	Own	Fin	Fin	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	5500	178 7/2	85
Wichita RX.	3600	Beav JA	4 1/2 x 6	28.9 H	C	Dup	Per	MeC	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	5900	160 80	80
1 1/2 Ton																												
Acason L.	4295	Wau CU	4 1/2 x 5 1/2	32.4 L	C	Dup	Wau	Can	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	7000	180	180
Acson L.	4050	Cont LA	4 1/2 x 5 1/2	32.4 L	C	Dup	Dup	GO	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6650	168 5/8	56
Apex C.	3975	Buda YTU	4 1/2 x 6	32.4 L	L	GO	Dup	GO	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Armstrong KW.	4275	Buda & Cont	4 1/2 x 6	32.4 L	L	Own	Mon	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Atterbury 7D-LWB.	4175	Cont E4	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Atterbury 7D-Standard.	4350	Own Y	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Autocar Y.	4500	Own B	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Autocar B.	4300	Own Y	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Available H3 1/2.	4475	Her MU3	4 1/2 x 5 1/2	32.4 L	L	Own	P	Chic	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Belmont D.	4100	Cont LA	4 1/2 x 5 1/2	32.4 L	L	Own	P	Bus	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Brooklyn R-4	4425	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	GO	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Capitol M-3 1/2.	4400	Her MU3	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Chicago C3 1/2.	4400	Own MU3	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Clydesdale 90C	4500	Cont E4	4 1/2 x 5 1/2	32.4 L	L	Own	G	MeC	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Corbitt A.	6100	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Couple Gear HC	3950	Buda YTU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Dart M-7	3950	Cont E4	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Day Elder F 3 1/2.	3550	Buda YTU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Dependable G 3 1/2.	4675	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Diamond T-K.	5100	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Donore 3 1/2.	4400	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Dorris K7.	4250	Buda YTU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Duplex E.	5000	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Erie 3 1/2.	3950	Cont E4	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Fargo 4500.	4050	Buda YTU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Federal WE.	4050	Buda YTU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Garford 77D.	4450	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Gant 17.	4375	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
G. M. C. K-71.	4375	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Gramm-Bernstein 35.	3250	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Hahn F.	3250	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Hail-Fur B.	4100	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Hail-Fur W.	4100	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Hall 3 1/2 Worn.	3975	Buda YTU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Harvey WHA.	4500	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Hendrickson A.	4500	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Hewitt-Ludlow.	4285	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Humboldt.	4285	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li	DD	Eis	W	B-Li	1 1/2 Fl	7.75	41.5	Ros	36x4	36x8	22	23	6800	186 80	80
Indians 35.	4255	Wau CU	4 1/2 x 5 1/2	32.4 L	L	Own	G	Own	FS	Shelb	V	Pier	B-Li															

Ruinier 12-15.....	4,000	Cont 14
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## ELECTRIC COMMERCIAL CARS

E. C. M.	Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Spring	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent of Weight on Rear Wheels
	Ward WS 2.....	750	1500	.....	13	Opt	45	G-E	Own	4	W	Shel	Shel	32x3	32x3	Own	88	60
	*C-T BR 1.....	1000	2000	2075	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3	W	89 1/4	60
	Walker M.....	1000	2300	.....	15	Opt	60	G-E	West	5	O	Own	Math	34x3	36x3 1/2	Ross	93	66
	Atlantic 1C.....	2000	2770	.....	12	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x4	Ross	103	65
	Ward WA.....	1250	2730	.....	12	Opt	45	G-E	G-E	4	W	Shel	Shel	32x3	34x3 1/2	Own	90	60
	*C-T BR 2.....	2000	2400	2400	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3 1/2	36x4	W	101	60
	Lansden 1.....	.....	2900	.....	12	.....	50	.....	.....	.....	.....	.....	.....	36x3	36x3 1/2	.....	.....	.....
	Steinmetz.....	.....	.....	.....	16	Exide	.....	Own	.....	4	B	.....	.....	32x4*	32x4*	Opt	.....	.....
	*Walker K.....	2000	2500	.....	14	Opt	60	G-E	West	5	O	Own	Math	34x3 1/2	36x4	Ross	96	66
	Ward WB.....	2000	3430	.....	10	Opt	40	G-E	G-E	4	W	Shel	Shel	34x3 1/2	36x4	Own	102	60
	Atlantic 2C.....	4000	3590	.....	11	Opt	.....	G-E	G-E	4	C	Timk	S-El	34x4	36x3 1/2	Ross	115	65
	*C-T BR 4.....	4000	4000	2800	12	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x4	36x4 1/2	W	116	60
	Lansden 2.....	.....	4400	.....	11	.....	50	.....	.....	.....	.....	.....	.....	36x4	36x3	.....	.....	.....
	*Walker L.....	4000	3700	.....	13	Opt	60	G-E	West	5	O	Own	Math	38x4	38x6	Ross	112	66
	Ward WD.....	4000	4500	.....	8.5	Opt	35	G-E	G-E	4	W	Shel	Shel	36x4	36x7	Own	114	60
	Atlantic 3C.....	7000	5220	.....	10	Opt	.....	G-E	G-E	5	C	Timk	.....	36x5	40x5 1/2	Ross	135	65
	*C-T AK 7.....	7000	5800	4200	11	Opt	50	G-E	G-E	4	I	Dead	Shel	36x6	36x4 1/2	W	122	55
	Lansden 3 1/2.....	.....	5700	.....	10	.....	45	.....	.....	.....	.....	.....	.....	36x5	36x4	.....	.....	.....
	Ward WF.....	7000	6600	.....	7	Opt	30	G-E	G-E	5	W	Shel	Shel	36x5	36x8	Own	132	70
	Atlantic 5C.....	10000	6230	.....	9	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x5 1/2	Ross	144	65
	Couple Gear H.....	7000	9000	4750	10	Phil	30	Own	Own	5	B	Own	Tut	36x5 1/2	36x5 1/2	Own	96	55
	Couple Gear A.....	10000	10000	5250	7	Phil	30	Own	Own	5	B	Own	Tut	36x5 1/2	36x5 1/2	Own	96	75
	*C-T AK 10.....	10000	6500	4400	10	Opt	50	G-E	G-E	4	I	Dead	Shel	36x7	36x5 1/2	W	132	55
	Lansden 5.....	.....	7500	.....	9	.....	40	.....	.....	.....	.....	.....	.....	36x6	36x5	.....	.....	.....
	*Walker P.....	7000	5300	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	40x5 1/2	Ross	131	66
	*Walker N.....	10000	6300	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	40x6 1/2	Ross	141	66
	Ward WH.....	10000	8375	.....	6	Opt	26	G-E	G-E	5	W	Shel	Shel	36x7	40x10	Own	144	70
	Atlantic 6C.....	13000	6940	.....	8	Opt	.....	G-E	G-E	5	C	Timk	S-El	36x6	40x6	Ross	156	65
	Couple Gear LD.....	14000	11000	5900	10	Phil	30	Own	Own	5	B	Own	Tut	36x5 1/2	36x5	Own	96	55

## Manufacturers Whose Models Are Included in Specifications on Preceding Pages

Acason—1, 1 1/2, 2, 3 1/2, 5—Acason Motor Truck Co., Detroit, Mich.  
 Ace—1 1/2, 2 1/2—American Motor Truck Co., Newark, Ohio.  
 Acme—3/4, 1, 1 1/2, 2, 3 1/2, 5—Acme Motor Truck Co., Cadillac, Mich.  
 Akron Multi-Truck—1—Thomart Motor Truck Co., Kent, Ohio.  
 American—2 1/2, 4—American Motor Truck & Tractor Co., Portland, Conn.  
 Apex—1, 1 1/2, 2 1/2, 3 1/2—Hamilton Motor Co., Grand Haven, Mich.  
 Armleder—1, 2 1/2, 3 1/2—O. Armleder Co., Cincinnati, Ohio.  
 Atco—1 1/2, 2 1/2—American Truck & Trailer Corp., Kankakee, Ill.  
 Atlantic—1, 2, 3, 5, 6—Atlantic Electric Vehicle Co., Newark, N. J.  
 Atlas—1—Atlas Truck Corp., York, Pa.  
 Atterbury—1 1/2, 2 1/2, 3 1/2, 5—Atterbury Motor Car Co., Buffalo, N. Y.  
 Autocar—2, 3 1/2—Autocar Co., Ardmore, Pa.  
 Available—1 1/2, 2 1/2, 3 1/2, 5, 7—Available Truck Co., Chicago, Ill.  
 Avery—1—Avery Company, Peoria, Ill.  
 Bartlett—7—Bartlett Truck Co., Chicago, Ill.  
 Beck-Hawkeye—1, 1 1/2, 2, 3—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.  
 Bell—1, 1 1/2, 2 1/2—Iowa Motor Truck Co., Ottumwa, Ia.  
 Belmont—1, 1 1/2, 2, 3 1/2—Belmont Motors Corp., Lewistown, Pa.  
 Bessemer—1, 1 1/2, 2 1/2, 4—Bessemer Motor Truck Co., Grove City, Pa.  
 Bethlehem—1, 2, 3, 4—Bethlehem Motor Truck Corp., Allentown, Pa.  
 Birch—1—Birch Motor Cars, Chicago, Ill.  
 Bridgeport—1 1/2, 2 1/2, 4, 6—Bridgeport Motor Truck Co., Bridgeport, Conn.  
 Brinton—2 1/2—Brinton Motor Truck Co., Philadelphia, Pa.  
 Briscoe—1—Briscoe Motor Corp., Jackson, Mich.  
 Brockway—3/4, 1 1/2, 2 1/2, 3 1/2, 5—Brockway Motor Truck Co., Cortland, N. Y.  
 C. T.—1, 1 1/2, 2, 3 1/2, 5—Commercial Truck Co., Philadelphia, Pa.  
 Capitol—1 1/2, 2 1/2, 3 1/2—Capitol Motors Corp., Fall River, Mass.  
 Case—2—J. I. Case Plow Works Co., Racine, Wis.  
 Chevrolet—3/4, 1—Chevrolet Motor Co. of Mich., Flint, Mich.  
 Chicago—1 1/2, 2 1/2, 3 1/2, 5—Chicago Motor Truck, Inc., Chicago, Ill.  
 Climber—1 1/2—Climber Motor Corp., Little Rock, Ark.  
 Clydesdale—1, 1 1/2, 2 1/2, 3 1/2, 5—Clydesdale Motor Truck Co., Clyde, Ohio.  
 Collier—1, 1 1/2, 2, 2 1/2—Collier Motor Truck Co., Bellevue, Ohio.  
 Columbia—1 1/2, 2 1/2—Columbia Motor Truck & Trailer Co., Pontiac, Mich.  
 Commerce—1 1/4, 1 1/2, 2—Commerce Motor Car Co., Detroit, Mich.  
 Concord—1 1/2, 2 1/2—Abbott-Downing Truck & Body Co., Concord, N. H.  
 Corbitt—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Corbitt Motor Truck Co., Henderson, N. C.  
 Couple Gear—3 1/2, 5 1/2, 6—Couple Gear Electric Truck Co., Grand Rapids, Mich.  
 Cyclone—1 1/2—The Cyclone Starter & Truck Co., Greenville, S. C.  
 Dart—1 1/2, 2 1/2, 3 1/2—Dart Truck & Tractor Corp., Waterloo, Ia.  
 Day-Elder—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Day-Elder Motors Corp., Newark, N. J.  
 Dearborn—1 1/2, 2—Dearborn Truck Co., Chicago, Ill.  
 Defiance—1, 1 1/2, 2—Defiance Motor Truck Co., Detroit, Mich.  
 Denby—1, 1 1/2, 2, 3, 4, 5—Denby Motor Truck Co., Detroit, Mich.  
 Dependable—1, 1 1/2, 2, 2 1/2, 3 1/2—Dependable Truck & Tractor Co., Galesburg, Ill.  
 Diamond T—1 1/4, 1 1/2, 2, 3 1/2, 5—Diamond T Motor Car Co., Chicago, Ill.  
 Diehl—1—Diehl Motor Truck Works, Philadelphia, Pa.  
 Doane—2 1/2, 3 1/2, 5—Doane Motor Truck Co., San Francisco, Cal.  
 Dodge—1 1/2—Dodge Bros., Detroit, Mich.  
 D-Olt—1 1/2—D-Olt Motor Truck Co., Inc., Long Island City, N. Y.  
 Dorris—2, 3 1/2—Dorris Motor Car Co., St. Louis, Mo.  
 Double Drive—4—Double Drive Truck Co., Chicago, Ill.  
 Douglas—1 1/2, 2, 3—Douglas Motors Corp., Omaha, Neb.  
 Duplex—2, 3 1/2—Duplex Truck Co., Lansing, Mich.  
 Duty—2—Duty Motor Co., Greenville, Ill.  
 Eagle—2—Eagle Motor Truck Corp., St. Louis, Mo.

Erie—1 1/2, 2, 2 1/2, 3 1/2—Erie Motor Truck Mfg. Co., Erie, Pa.  
 F. W. D.—3—Four-Wheel Drive Auto Co., Clintonville, Wis.  
 Facto—2 1/2—Facto Motor Trucks, Springfield, Mass.  
 Fageol—1 1/2, 2 1/2, 3 1/2, 5—Fageol Motors Co., Oakland, Cal.  
 Fargo—2—Fargo Motor Truck Co., Chicago, Ill.  
 Federal—1, 1 1/2, 2, 3 1/2, 5, T.T.—Federal Motor Truck Co., Detroit, Mich.  
 Ford—1—Ford Motor Co., Highland Park, Mich.  
 Forschler—1, 1 1/2, 2, 3—Forschler Motor Truck Mfg. Co., New Orleans, La.  
 Front Drive—1 1/2—Double Drive Truck Co., Chicago, Ill.  
 Fulton—1, 2, T.T.—Fulton Motors Corp., Farmingdale, N. Y.  
 G. M. C.—3/4, 1, 2, 3 1/2, 5—General Motors Truck Co., Pontiac, Mich.  
 G. W. W.—1 1/2—Wilson Truck Mfg. Co., Henderson, Ia.  
 Garford—3/4, 1 1/2, 2, 3 1/2, 5, 7 1/2—Garford Motor Truck Co., Lima, O.  
 Gary—1 1/2, 2 1/2, 3 1/2, 5—Gary Motor Truck Co., Gary, Ind.  
 Gersix—1 1/2, 2 1/2, 3—Gersix Mfg. Co., Seattle, Wash.  
 Giant—1 1/2, 2 1/2, 3 1/2, 5—Giant Truck Corp., Chicago Heights, Ill.  
 Globe—3/4—Globe Motors Co., Cleveland, Ohio.  
 Graham—1 1/2—Graham Brothers, Evansville, Ind.  
 Gramm-Bernstein—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Gramm-Bernstein Motor Truck Co., Lima, Ohio.  
 Hahn—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Hahn Motor Truck & Wagon Co., Hamburg, Pa.  
 Hal-Fur—2, 3 1/2—Hal-Fur Motor Truck Co., Cleveland, Ohio.  
 Hall—2 1/2, 3 1/2, 5, 7—Lewis-Hall Motors Corp., Detroit, Mich.  
 Harvey—1 1/2, 2 1/2, 3 1/2, 5—Harvey Motor Truck Co., Harvey, Ill.  
 Hawkeye—1 1/2, 2—Hawkeye Truck Co., Sioux City, Ia.  
 Hendrickson—2 1/2, 3 1/2, 5—Hendrickson Motor Truck Co., Chicago, Ill.  
 Hewitt-Ludlow—1 1/2, 2, 2 1/2, 3 1/2, 5, T.T.—Hewitt-Ludlow Auto Co., Inc., San Francisco, Cal.  
 Highway-Knight—4, 5—Highway Truck Corp., Chicago, Ill.  
 Higrade—1, 1 1/2—Higrade Motors Co., Harbor Springs, Mich.  
 H. R. L.—3/4, 1 1/2, 2 1/2—H. R. L. Motor Co., Seattle, Wash.  
 Huffman—1 1/2—Huffman Bros. Co., Elkhart, Ind.  
 Hurlburt—1 1/2, 2 1/2, 3 1/2, 5—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.  
 Huron—1 1/2, 2 1/2—Huron Truck Co., Bad Axe, Mich.  
 Independent—1 1/2, 2 1/2, 3 1/2—Independent Motor Co., Youngstown, Ohio.  
 Independent—1 1/2, 2 1/2—Independent Motor Truck Co., Inc., Davenport, Ia.  
 Indiana—1 1/4, 2, 2 1/2, 3 1/2, 5—Indiana Truck Corp., Marion, Ind.  
 International—1, 1 1/2, 2, 3, 5—International Harvester Co., Chicago, Ill.  
 Italia—2, 3, 5—Italia Motor Truck Co., San Francisco, Cal.  
 Jackson—3 1/2—Jackson Motors Corp., Jackson, Mich.  
 J & J—2—The Lorain Motor Truck Co., Lorain, Ohio.  
 Jumbo—1 1/2, 2, 2 1/2, 3, 3 1/2, 4—Nelson Motor Truck Co., Saginaw, Mich.  
 Kalamazoo—1 1/2, 2 1/2, 3 1/2—Kalamazoo Motor Corp., Kalamazoo, Mich.  
 Kankakee—2 1/2—Kankakee Automobile Co., Kankakee, Ill.  
 Karavan—2 1/2—Caravan Motors Co., Portland, Ore.  
 Kearns—3/4, 1 1/2—Kearns-Dughe Motors Co., Danville, Pa.  
 Kelly-Springfield—1 1/2, 2 1/2, 3 1/2, 5, 6—Hare's Motors, Inc., New York, N. Y.  
 Keystone—2—Keystone Motor Truck Corp., Philadelphia, Pa.  
 Kimball—2, 2 1/2, 3, 4, 5—Kimball Motor Truck Co., Los Angeles, Cal.  
 King Zeitler—2, 4—King Zeitler Co., Chicago, Ill.  
 Kissel—1, 1 1/2, 2 1/2, 4, 5—Kissel Motor Car Co., Hartford, Wis.  
 Kleiber—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Kleiber & Co., Inc., San Francisco, Cal.  
 Koehler—1 1/2, 2 1/2, 3 1/2, T.T.—H. J. Koehler Motors Corp., Bloomfield, N. J.  
 Lange—2—Lange Motor Truck Co., Pittsburgh, Pa.  
 Lansden—1, 2, 3 1/2, 5—Lansden Company, Danbury, Conn.  
 Larrabee-Deyo—1 1/2, 2 1/2, 3 1/2, 5—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.



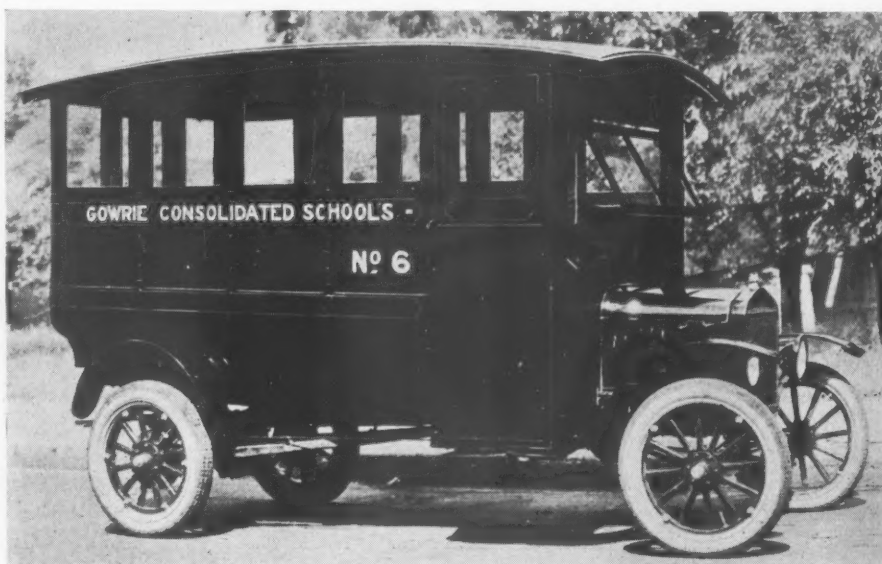
- L. M. C.**—2½—Louisiana Motor Car Co., Shreveport, La.  
**Lombard**—T.T.—Lombard Auto Tractor Truck Corp., New York, N. Y.  
**Lone Star**—1—Lone Star Truck & Tractor Assn., San Antonio, Tex.  
**Luedinghaus**—1, 1½, 2—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.  
**Luverne**—2, 3—Luverne Automobile Co., Luverne, Minn.  
**Maccar**—1½, 2½, 3½, 6—Maccar Truck Co., Scranton, Pa.  
**MacDonald**—7—MacDonald Truck & Tractor Co., San Francisco, Cal.  
**Mack**—1½, 2, 3½, 5, 6½, 7½, T.T.—International Motor Co., New York, N. Y.  
**Master**—1½, 2½, 3½, 5, T.T.—Master Trucks, Inc., Chicago, Ill.  
**Maxwell**—1½—Maxwell Motor Co., Inc., Detroit, Mich.  
**Menominee**—1, 1½, 2, 3½, 5—Menominee Motor Truck Co., Menominee, Mich.  
**Moline**—1½—Moline Plow Co., Moline, Ill.  
**Moreland**—1, 1½, 2½, 4, 5—Moreland Motor Truck Co., Los Angeles, Cal.  
**Mutual**—2, 2½—Mutual Truck Co., Sullivan, Ind.  
**Napoleon**—¾, 1, 1½—Napoleon Motors Co., Traverse City, Mich.  
**Nash**—1, 2—Nash Motors Co., Kenosha, Wis.  
**Nelson-LeMoon**—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.  
**Netco**—2, 2½—New England Truck Co., Fitchburg, Mass.  
**Niles**—2—Niles Motor Truck Co., Pittsburgh, Pa.  
**Noble**—1½, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.  
**Northway**—2, 3½—Northway Motors Co., Natick, Mass.  
**Norwalk**—1, 1½—Norwalk Motor Car Co., Martinburg, W. Va.  
**O. K.**—1½, 2, 2½, 3½—Oklahoma Auto Mfg. Co., North Muskogee, Okla.  
**Ogden**—1½, 2½—Ogden Motor Truck Co., Chicago, Ill.  
**Old Hickory**—1—Kentucky Wagon Mfg. Co., Louisville, Ky.  
**Old Reliable**—1½, 2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.  
**Oldsmobile**—1—Olds Motor Works, Lansing, Mich.  
**Olympic**—2½—Olympic Motor Truck Co., Tacoma, Wash.  
**Oneida**—1½, 1½, 2½, 3½, 5—Oneida Motor Truck Co., Green Bay, Wis.  
**Orleans**—1½, 2½, 3½—New Orleans Motor Truck Mfg. Co., New Orleans, La.  
**Oshkosh**—2—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.  
**Packard**—2, 3, 5—Packard Motor Car Co., Detroit, Mich.  
**Paige**—1½, 2½, 3½—Paige-Detroit Motor Car Co., Detroit, Mich.  
**Parker**—2, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.  
**Patriot**—1, 2, 3—Patriot Motors Co., Lincoln, Neb.  
**Pierce-Arrow**—2, 3½, 5—Pierce-Arrow Motor Car Co., Buffalo, N. Y.  
**Pioneer**—1—Pioneer Truck Co., Chicago, Ill.  
**Pittsburgher**—2½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.  
**Power**—1½, 3½—Power Truck & Tractor Co., Detroit, Mich.  
**Premocar**—1½—Preston Motors Corp., Birmingham, Ala.  
**Rainier**—¾, 1, 1½, 2, 2½, 3½, 5—Rainier Motor Corp., Flushing, L. I., N. Y.  
**Reliance**—1½, 2—Reliance Motor Truck Co., Appleton, Wis.  
**Reo**—1—Reo Motor Car Co., Lansing, Mich.  
**Republic**—1, 1½, 2½, 3½—Republic Motor Truck Co., Inc., Alma, Mich.  
**Reynolds**—1½, 2½, 3½, 5—Reynolds Motor Truck Co., Mt. Clemens, Mich.  
**Riker**—3, 4—Locomobile Co. of America, Bridgeport, Conn.  
**Rowe**—1½, 2, 3, 4, 5—Rowe Motor Mfg. Co., Lancaster, Pa.  
**Rumely**—1½—Advance-Rumely Thresher Co., Inc., La Porte, Ind.  
**Sandow**—1, 1½, 2, 2½, 3½, 5—Sandow Motor Truck Co., Chicago, Ill.  
**Sanford**—2½, 3½, 5—Sanford Motor Truck Co., Syracuse, N. Y.  
**Schacht**—2, 2½, 3½, 5—G. A. Schacht Motor Truck Co., Cincinnati, Ohio.  
**Schwartz**—1, 1½, 2½, 4—Schwartz Motor Truck Co., Reading, Pa.  
**Selden**—1½, 2½, 3½, 5—Selden Truck Corp., Rochester, N. Y.  
**Seneca**—¾—Seneca Motor Car Co., Fostoria, Ohio.  
**Service**—¾, 1, 1½, 2½, 3½, 5—Service Motor Truck Co., Wabash, Ind.  
**Signal**—1, 1½, 2½, 3½, 5—Signal Motor Truck Co., Detroit, Mich.  
**Southern**—1, 1½, 2—Southern Truck & Car Corp., Greenboro, N. C.  
**Standard**—1, 2½, 3½, 5—Standard Motor Truck Co., Detroit, Mich.  
**Steinmetz**—¾—Steinmetz Electric Motor Car Corp., Baltimore, Md.  
**Sterling**—1½, 2, 2½, 3½, 5, 7½—Sterling Motor Truck Co., Milwaukee, Wis.  
**Stewart**—¾, 1, 1½, 2, 2½, 3½—Stewart Motor Corp., Buffalo, N. Y.  
**Stoughton**—1, 1½, 2, 2½—Stoughton Wagon Co., Stoughton, Wis.  
**Success**—2½—Webberville Truck Co., Webberville, Mich.  
**Super Truck**—2½, 3½, 5—O'Connell Motor Truck Co., Waukegan, Ill.  
**Superior**—1, 2—Superior Motor Truck Co., Atlanta, Ga.  
**Tiffin**—1½, 2½, 3½, 5, 6—Tiffin Wagon Co., Tiffin, Ohio.  
**Titan**—2½, 3½, 5—Titan Truck Co., Milwaukee, Wis.  
**Tower**—1½, 2½, 3½—Tower Motor Truck Co., Greenville, Mich.  
**Trabold**—2½—The Trabold Company, Johnstown, Pa.  
**Traffic**—2—Traffic Motor Truck Corp., St. Louis, Mo.  
**Transport**—1, 1½, 2½, 3½—Transport Truck Co., Mt. Pleasant, Mich.  
**Traylor**—1½, 2, 3, 4, 5—Traylor Eng. & Mfg. Co., Cornwells, Pa.  
**Triangle**—¾, 1½, 2, 2½—Triangle Motor Truck Co., St. Johns, Mich.  
**Triumph**—1½, 2—Triumph Truck & Tractor Co., Kansas City, Mo.  
**Twin City**—F. W. D., 3½—Twin City Four-Wheel Drive Co., Inc., St. Paul, Minn.  
**Twin City**—2, 3½—Minneapolis Steel & Mach. Co., Minneapolis, Minn.  
**Ultimate**—1½, 2, 2½, 3—Vreeland Motor Co., Inc., Newark, N. J.  
**Union**—2½, 4—Union Motor Truck Co., Bay City, Mich.  
**United**—1½, 2½, 3½, 5—United Motors Co., Grand Rapids, Mich.  
**Ursus**—1, 1½, 2½—Ursus Motor Co., Inc., Chicago, Ill.  
**U. S.**—1½, 3, 4, 5—United States Motor Truck Co., Cincinnati, Ohio.  
**Velle**—1½—Velle Motors Corp., Moline, Ill.  
**Vim**—½, 1, 2, 3—Vim Motor Truck Co., Philadelphia, Pa.  
**Walker**—¾, 1, 2, 3½, 5—Walker Vehicle Co., Chicago, Ill.  
**Walker-Johnson**—2½—Walker-Johnson Truck Co., Woburn, Mass.  
**Walter**—5—Walter Motor Truck Co., New York, N. Y.  
**Ward**—¾, 1, 2, 3½, 5—Ward Motor Vehicle Co., Mt. Vernon, N. Y.  
**Ward La France**—2½, 3½, 5—Ward La France Truck Co., Inc., Elmira, N. Y.  
**Watson**—¾, 3½, T.T.—Watson Wagon Co., Canastota, N. Y.  
**White**—¾, 2, 3½, 5—White Co., Cleveland, Ohio.  
**White Hickory**—1, 1½, 2½—White Hickory Motor Corp., Atlanta, Ga.  
**Wichita**—1, 1½, 2, 2½, 3, 3½, 5½—Wichita Falls Motors Co., Wichita Falls, Tex.  
**Wilcox**—1, 1½, 2½, 3½, 5—H. E. Wilcox Motor Co., Minneapolis, Minn.  
**Wilson**—1½, 2½, 3½, 5—J. C. Wilson Co., Detroit, Mich.  
**Winther**—1, 1½, 2, 2½, 3½, 5, 6—Winther Motor Truck Co., Kenosha, Wis.  
**Witt-Will**—1½, 2—Witt-Will Co., Inc., Washington, D. C.  
**Wolverine**—1, 1½, 2, 2½, 3½—American Commercial Car Co., Detroit, Mich.  
**Yale**—1½—Yale Motor Truck Co., New Haven Conn.  
**Yellow Cab**—¾, 1—Yellow Cab Mfg. Co., Chicago, Ill.

## Ruggles Head New Company to Manufacture Trucks

Frank W. Ruggles, former president and general manager of the Republic Motor Truck Co., of Alma, Mich., under whose guidance the company made such successful progress, is now backing a company to manufacture trucks to be known as the Ruggles Motor Truck Co. The concern was recently incorporated at \$2,000,000 at Saginaw, Mich.

The new company has ample financial backing, and with Mr. Ruggles' truck knowledge and experience, it has a promising future. It is expected that the first truck models will be ready for showing in July.

The officers elected are as follows: Frank W. Ruggles, president; W. J. Wickes, vice-president; Julius B. Kirby, vice-president; Ezra L. Smith, secretary; Walter C. Hill, treasurer; Charles T. Kerry, assistant treasurer, and John F. O'Keefe, counsel. The board of directors include the above named men, also Benton Hanchett, R. T. Robinson, Otto L. Dittmar, John J. Thorne and Harry H. Price.



Special School Bus Body for Ford Truck Recently Announced by the Kratz Carriage Co., Des Moines, Iowa

It is a ten-foot body, capable of accommodating from 16 to 18 passengers. Its model number is 105-T. The frame work is of hardwood and the panels of steel. Sills and cross members are of hardwood, oak or hickory. Ventilators are provided at each end of the body and the side windows are of the drop type. The trimmings of the upholstery is of smooth, sanitary material, which permits ready cleaning. This job is 56 in. high; 60 in. wide; and provides a 24-in. aisle. The seats are 15 in. high and the doors 22 in. wide. Three different sizes of this bus body are made; namely, 10, 12 and 14-ft. lengths.

# Taken From Current House Organs

## How About a Little Washing?

The advertising value of a properly painted truck is often minimized by lack of care in keeping the painted surface clean. Stand on a busy street corner where traffic is heavy and watch the trucks go by. Most of them look as though they had not seen a good washing since the last heavy rain storm. The single truck owner and the concern with a small fleet, generally have no regular time for cleaning their equipment. It is left to chance. As a result, the dust and dirt accumulate on the trucks and the publicity value of a clean, attractive-looking vehicle is lost.

One of the best investments an Acme owner can make is a wash rack, and after it has been installed, he should see that the drivers use it regularly, according to a prescribed schedule. It will pay him to put aside a definite amount of the driver's time each month so that the truck will receive a thorough cleaning at regular intervals.

There is a coal company in Philadelphia that keeps the body and name plate on its trucks glistening regardless of the load and conditions. If a coal company with heavy dump equipment can keep its trucks in such order, how much easier is it not for the average owner to keep his truck with platform body clean and in good condition. — *Acme Angles, Acme Motor Truck Co., Cadillac, Mich.*

## Know Your Line

The 1921 salesman who is not thoroughly informed regarding the motor truck or passenger car he is selling or trying to sell, is very apt to encounter two embarrassing situations. First, he will maybe encounter the prospect who knows considerably more about the construction and worth of his car than he knows himself. This puts the salesman at a disadvantage, for the moment the prospect senses the truth he will take delight in tangling the salesman up in a mass of contradictions. The moment the customer becomes the dominant party in the conversation the chances for a sale are lessened. If he knows ALL about

it, that the accredited representative can tell him nothing new regarding construction or performance, his interest dies, and he passes on to await the coming of a real salesman who can intrigue his interest and spring a surprise or two.

Second, he meets the buyer who confesses his total ignorance, but wants the best that a given amount of money will purchase. This man doesn't want to look at pretty photographs, or hear generalities about "careful, honest construction." He wants real FACTS and PROOF, and if the salesman cannot give them he goes on to one who can.

Once upon a time selling automobiles was merely an occupation. In 1921 it is going to be an art.

Forecasters tell us that this year's market calls for some two million cars for replacement purposes. So the big market this year is to be sold to those who have bought and driven cars for years over all kinds of roads and under all sorts of conditions.

And, believe us, these buyers will have to be SHOWN.—*Timken Magazine, Timken-Detroit Axle Co., Detroit, Mich.*

## Rules for Pedestrians

1. Pedestrians crossing streets at night shall wear a white light in front and a red light in rear.
2. Before turning to the right or left they shall give three short blasts on a horn at least three inches in diameter.
3. When an inexperienced truck driver is made nervous by a pedestrian, he shall indicate the same, and the pedestrian shall hide behind a tree until the automobile has passed.
4. Pedestrians shall not carry in their pockets any sharp instrument which may cut tires.
5. In dodging trucks, pedestrians shall not run more than seven miles an hour.
6. Pedestrians must register at the beginning of each year and pay a license fee of \$5.00 for the privilege of living. There shall be no rebate if they do not live the entire year.—*Bulletin, (Auto Club of Hartford).*

## "The Gift of Gab" in Salesmanship

"I wish I had the gift of gab, like my friend Jones," said a young salesman to I. Getcher Order, on a railroad train one morning. "Jones is the most fluent talker I ever heard. It's wonderful what a command of language he has. He is a regular encyclopaedia about his line, and talks splendidly. I'll bet his customers like to listen to him."

"And I'll bet they don't buy much," answered Getcher. "It's my experience that when a salesman talks so well, and knows so much about everything, he can talk himself out of an order, after he has the stage all properly set for the John Hancock. Of course every salesman should talk well, smoothly, if possible, and without jerkiness and nervousness. He must also know his line; the more he knows about it the better. He's got to convince his customers, not amuse or entertain, or even instruct them. If he can do all these, well and good; but such a bird is very rare.

"I was just thinking," continued the veteran salesman. "In the history of the United States, Daniel Webster, Henry Clay, William Jennings Bryan and several other noted orators couldn't sell themselves into the presidency. People listened to them with delight, but voted for the other fellow. Washington, Lincoln, McKinley, all thinkers and fine talkers, landed what they went after.

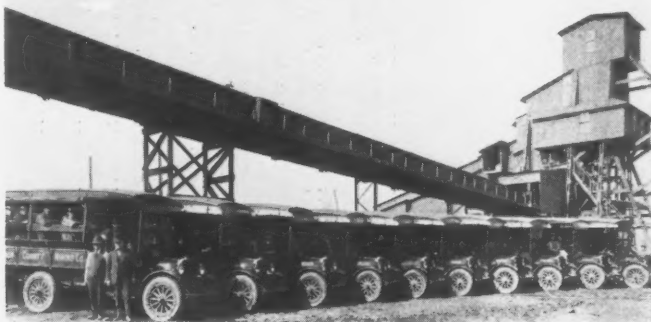
"So a prospect may think a salesman intelligent, gifted, interesting and entertaining, and yet not buy from him. The object of all sales talks is to sell goods. So unless the salesman can drive his points home to make the prospective buyer desire an oil storage system, or whatever he has for sale, all the 'gift of gab' in the world is worse than useless.

"And don't you ever believe that Washington, Lincoln, McKinley and the others neglected the proper expression of their thoughts when speaking. They were convincing because they were simple and direct."—*Milwaukee Tank News, Milwaukee Tank Works, Milwaukee, Wis.*



**Transport Truck Operates Snow Shovel as Road Grader**

There being but little use for snow shovels last winter, the Transport Truck Co., Mount Pleasant, Mich., employed a big snow shovel in road grading. It was attached to the front of a 3½ ton Transport and operated over a half mile of road running past the plant. Back and forth over this long stretch the heavy shovel was driven at several inches depth.



**Passenger Buses Haul Employees**

More and more are manufacturing concerns using motor equipment to haul their employees. The illustration shows a fleet of Commerce passenger buses in the service of the Sangamon County Mining Company near Springfield, Ill., who haul their employees to the mines.



Price List of Truck Pneumatic Tire Casings, With Capacities and Inflation Pressures of Larger Sizes

	36 x 6				38 x 7				40 x 8				42 x 9				44 x 10			
	Price	Carrying Capacity	Inflation Pressure		Price	Carrying Capacity	Inflation Pressure		Price	Carrying Capacity	Inflation Pressure		Price	Carrying Capacity	Inflation Pressure		Price	Carrying Capacity	Inflation Pressure	
Ajax Rubber Co., Inc., New York, N. Y.																				
Ajax Cord non-skid	34.30	52.30	55.30	59.15	62.05	73.65	75.60	77.35	110.40	2200	90	156.15	3000	100	201.15	4000	100			
American Rubber & Tire Co., Akron, O.																				
Americord, non-skid	30.50	54.90	58.00	62.10	65.10	77.30	81.20		117.75	2300	90	166.00	3100	100	213.85	4100	110			
Bergougnan Rubber Corp., Trenton, N. J.																				
Bergougnan Cord, non-skid	35.65	57.50	61.75	66.25	69.25	81.75	85.00		133.00	2000	90	179.00	2700	100	235.00	4000	110			
Briclson Mfg. Co., Omaha, Neb.																				
Briclson P. P. Studed	42.85	65.15	69.45	77.85	85.40		106.50		225.50	3000	100									
Braender Rubber & Tire Co., Rutherford, N. J.																				
Built-Dog Super Cord, non-skid	37.00	52.30	55.30	59.15	62.05	73.65	77.35		110.40	2200	90	156.15	3000	100	201.15	4000	110			
Brunswick-Balke-Collender Co., Chicago, Ill.																				
Brunswick-Cord, non-skid	26.00	41.85	44.75	47.30	49.65	58.90	61.90		88.30	2200	90	124.90	3000	100	160.90	4000	110			
Columbia Tire & Rubber Co., Mansfield, O.																				
Columbia Fabric	20.00	33.65	36.10																	
Columbia, non-skid	31.15	52.30	55.30	59.15	62.05	73.65	77.35													
Curtis Cord, road																				
Curtis Cord, road																				
Empire Tire & Rubber Co., Muskegon, Mich.																				
Empire Cord, non-skid	31.15	52.30	55.30	59.15	62.05	73.65	77.35		119.35	2200	90									
Empire Tire & Rubber Co., Trenton, N. J.																				
Empire Cord, non-skid	31.15	52.30	55.30	59.15	62.05	73.65	77.35		119.35	2000	90	168.80	2700	100	217.45	3650	110			
Erie, non-skid																				
Falls Rubber Co., Cuyahoga Falls, O.																				
Falls Cord, Neverslip Cord	33.75	52.90	55.80	60.95	63.95	75.00	77.65		120.00	2200	120	169.80	3000	130	218.75	4000	140			
Federal Rubber Co. of Ill., Cudahy, Wis.																				
Federal Cord, non-skid	31.15	52.30	55.30	59.15	62.05	73.65	77.35		123.00	2200	90	163.00	3000	100	225.00	4000	110			
Federal H. D. Cord Cross Bar Rugged																				
Firestone Tire & Rubber Co., Akron, O.																				
Firestone Cord, non-skid	31.45	52.80	55.85	59.75	62.65	74.40	78.10		118.50	2200	90	167.85	3000	100	216.25	4000	110			
Firestone Cord, non-skid																				
Fisk Rubber Co., Chicopee Falls, Mass.																				
Fisk Red Top	27.75	42.00	45.10		59.80				121.05	2300	100	171.05	3000	110	230.40		120			
Fisk Cord, non-skid	34.25	52.30	55.30	59.15	62.05	73.65	77.35		110.50	2200	90	156.50	3000	100	201.50	4000	110			
General Tire & Rubber Co., Akron, O.																				
General Cord, non-skid	32.50	56.40	58.65	64.75	67.95	80.40	82.05		117.75	2200	90	162.95	3000	100	209.85	4000	110			
Gillette Rubber Co., Eau Claire, Wis.																				
Gillette Safety Tread Cords	31.15	52.30	55.30	59.15	62.05	73.65	77.35		110.40	2200	90	156.15	3000	100	201.15	4000	110			
Goodrich, B. F., Rubber Co., Akron, O.																				
Goodrich Cord, ribbed																				
Goodrich Cord, Safety																				
Goodyear Tire & Rubber Co., Akron, O.																				
Goodyear Cord, ribbed																				
Goodyear Cord, All Weather																				
Goodyear Cord, non-skid																				
Gordon Tire & Rubber Co., Canton, O.																				
Gordon, non-skid, Triangle Cord																				
Hewitt Rubber Co., Buffalo, N. Y.																				
Hewitt Cord, non-skid	28.40	52.90	55.10	62.90	63.30	77.30	81.20		126.00	2100	90									
Howe Rubber Co., Inc., New Brunswick, N. J.																				
Howe Ultra Cord, non-skid	35.85	58.10	61.40	65.70	68.90	81.85	85.90		122.75	2000	90	174.00	2850	100						
India Tire & Rubber Co., Akron, O.																				
India Cord, non-skid																				
International India Rubber Corp., S. Bend, Ind.																				
Odell Cord, non-skid	35.95	61.60	65.00	69.40	73.15	86.65	90.90		119.35	2000	90									
Kelly-Springfield Tire Co., New York, N. Y.																				
Kelly-Springfield Cord, grooved	28.50	40.25	43.75	51.35	54.95		62.95		119.35	2000	90	168.80	2700	100						
Kelly-Springfield Cord, B. B.																				
Kelly-Springfield Cord, non-skid																				
Lee Tire & Rubber Co., New York, N. Y.																				
Lee F. P., non-skid	35.00	38.00	41.40	44.20			56.60		106.40	2000	90	143.20	3000	100	180.00	4000	110			
Long Wear Tire & Rubber Co., Anderson, Ind.																				
Long Wear, non-skid	30.55	42.50	45.50		58.80		65.05		111.30	1970	90	157.50	2720	100	203.15	3595	110			
McCready Tire & Rubber Co., Indiana, Pa.																				
McCready Fabric, non-skid																				
McCready Cord, non-skid	23.30	35.20	38.85	49.40	51.45		65.15													
McGraw Tire & Rubber Co., Cleveland, O.																				
McGraw Cord, non-skid	16.00	26.90	28.90	36.00	38.35	44.40	47.05													
McGraw Cord, non-skid	24.90	41.85	44.25	47.30	49.65	58.90	61.90		88.30	2000	90									
Madison Tire & Rubber Co., New York, N. Y.																				
Madison Cord, non-skid	21.70	35.05	38.25	47.70	50.80		62.30													
Manhattan Tire & Rubber Co., Mansfield, O.																				
Over Size	37.00	55.45	58.60	62.70	66.75	78.05	82.00													

NOTICE

We have been informed by the manufacturers of the following tires that a reduction of approximately 20% has been authorized on the list prices herewith given:

- Bergougnan
- Firestone
- Fisk
- Goodrich
- Goodyear
- Hewitt
- Kelly-Springfield
- Quaker City

THE COMMERCIAL CAR JOURNAL															69
Madison Tire & Rubber Co., New York, N. Y.	21.70	35.65	38.25	47.70	50.80	62.30	117.00	2000	90	.....	.....	.....	.....	.....	
Madison Fabric, non-skid	37.00	55.45	58.60	62.70	65.75	82.00	.....	.....	.....	.....	.....	.....	.....	.....	
Manhattan Tire & Rubber Co., Mansfield, O.	16.00	26.90	28.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Over Size Fabric	25.00	41.85	44.25	47.30	49.65	61.90	.....	.....	.....	.....	.....	.....	.....	.....	
Marathon Tire & Rubber Co., Cuyahoga Falls, O.	32.50	52.30	55.30	59.15	62.05	73.35	119.35	2200	100	.....	.....	.....	.....	.....	
Mason Tire & Rubber Co., Kent, O.	27.00	41.75	43.20	47.10	49.70	59.75	.....	.....	.....	.....	.....	.....	.....	.....	
Meyer Rubber Co., Columbus, O.	20.00	33.65	36.10	45.00	47.95	58.80	.....	.....	.....	.....	.....	.....	.....	.....	
Michelin Tire Co., Milltown, N. J.	20.00	33.50	36.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Michelin Fabric	51.50	54.90	58.95	61.50	72.15	75.85	111.00	.....	.....	.....	.....	.....	.....	.....	
Miller-Anderson Rubber Works, Anderson, Ind.	28.12	46.06	49.81	54.37	57.50	70.08	132.80	2200	90	146.40	3000	100	193.55	4000	
Double-Anchored Cord	32.00	52.35	55.25	59.20	61.95	73.70	76.15	119.35	2200	100	168.85	3000	110	217.50	
Miller Rubber Co., Akron, O.	38.85	61.85	65.05	70.95	74.30	83.95	89.00	125.80	2200	90	175.75	3000	100	222.00	
Monarch Rubber Co., Akron, O.	34.25	52.30	55.30	59.15	62.05	73.65	77.35	.....	.....	.....	.....	.....	.....	.....	
Mohawk Rubber Co., Akron, O.	20.60	34.70	37.20	.....	49.45	60.60	.....	.....	.....	.....	.....	.....	.....	.....	
Monarch Rubber Co., Hartville, O.	53.85	.....	.....	.....	63.95	79.70	.....	.....	.....	.....	.....	.....	.....	.....	
National Tire & Rubber Co., E. Palestine, O.	20.00	33.65	36.10	45.00	47.95	58.80	.....	.....	.....	.....	.....	.....	.....	.....	
Roamer & Olympian Fabric, non-skid	23.50	44.05	46.55	49.80	52.25	62.00	65.15	88.15	2000	90	.....	.....	.....	.....	
Nebraska Tire & Rubber Co., Omaha, Neb.	16.00	26.90	28.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Cornhusker	28.00	41.85	44.25	47.30	49.65	58.90	61.90	124.45	2200	90	176.25	3000	100	227.95	
Norwalk Tire & Rubber Co., Norwalk, Conn.	29.65	41.85	44.25	47.35	49.65	58.95	60.80	85.55	2200	90	125.95	3000	100	159.95	
Oldfield Tire Co., Akron, O.	53.30	56.25	60.10	63.35	75.05	78.75	113.10	2200	90	159.90	3000	100	205.20	4000	
Oldfield Cord, anti-skid	20.00	33.65	36.10	.....	47.95	58.80	.....	.....	.....	.....	.....	.....	.....	.....	
Para Bell Tire & Rubber Co., Mansfield, O.	22.00	36.45	38.95	47.80	50.85	64.60	.....	.....	.....	.....	.....	.....	.....	.....	
Over Size Fabric	35.70	57.65	60.95	65.20	68.40	83.05	85.25	121.80	2200	90	172.55	3000	100	.....	
Pennsylvania Rubber Co., Jeannette, Pa.	20.65	41.85	44.25	47.35	49.65	58.95	61.90	85.55	2200	90	125.95	3000	100	159.95	
Vacuum Cup, Cord	53.30	56.25	60.10	63.35	75.05	78.75	113.10	2200	90	159.90	3000	100	205.20	4000	
Perfection Tire & Rubber Co., Fort Madison, Ia.	20.00	33.65	36.10	.....	47.95	58.80	.....	.....	.....	.....	.....	.....	.....	.....	
Pharis Tire & Rubber Co., Newark, O.	22.00	36.45	38.95	47.80	50.85	64.60	.....	.....	.....	.....	.....	.....	.....	.....	
Quaker City Rubber Co., Philadelphia, Pa.	35.70	57.65	60.95	65.20	68.40	83.05	85.25	121.80	2200	90	172.55	3000	100	.....	
T. T. T. Cord	32.70	54.90	58.05	62.10	65.15	77.35	81.20	117.00	2200	120	165.00	3000	130	213.00	
Racine Auto Tire Co., Racine, Wis.	54.90	58.05	.....	65.15	.....	81.20	.....	.....	.....	.....	.....	.....	.....	.....	
Horseshoe Cord, non-skid	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Ribbed Tread	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Racine Rubber Co., Racine, Wis.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Racine Multi-Mile, Cord	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Republic Rubber Co., Youngstown, O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Standard Tire Co., Willoughby, O.	34.70	52.30	55.30	59.15	62.05	73.65	77.35	119.35	2200	90	168.80	3000	100	217.45	
Tiger Foot, non-skid	32.40	54.40	57.50	61.50	64.50	76.60	80.45	119.35	2200	90	168.80	3000	100	217.45	
Star Rubber Co., Akron, O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Star Cord, All Star	34.25	54.00	57.00	65.90	69.50	76.50	80.50	113.00	2200	90	160.50	3000	100	.....	
Meteor Cord, non-skid	55.30	58.40	67.40	71.10	78.50	80.50	82.50	116.00	2200	90	163.80	3000	100	213.00	
Swinehart Tire & Rubber Co., Akron, O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Swinehart Cord, Hexagon	53.75	56.80	60.50	63.70	75.50	79.25	114.80	2000	90	162.40	3000	120	.....	.....	
Syracuse Rubber Co., Inc., Syracuse, N. Y.	31.95	53.75	56.70	60.65	63.60	75.70	79.30	119.35	2200	50	163.75	3000	100	216.60	
Syra-Cord, non-skid	23.95	36.20	39.45	46.90	49.60	60.35	64.85	.....	.....	.....	.....	.....	.....	.....	
Trent Rubber Co., Trenton, N. J.	35.05	52.30	56.30	62.60	66.70	77.00	82.70	.....	.....	.....	.....	.....	.....	.....	
Trent Fabric, non-skid	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Trent Cord, non-skid	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Tropical Tire & Rubber Co., New York, N. Y.	22.90	37.35	39.90	49.90	53.20	61.55	64.90	.....	.....	.....	.....	.....	.....	.....	
Tropical Fabric, non-skid	33.85	56.45	59.55	63.60	67.00	79.50	83.35	.....	.....	.....	.....	.....	.....	.....	
Tropical Cord, non-skid	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Tyler Rubber Co., Andover, Mass.	20.55	33.65	36.10	45.00	47.95	58.80	77.40	.....	.....	.....	.....	.....	.....	.....	
Tyrian Fabric, non-skid	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Tyrian Cord, non-skid	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
United States Tire Co., New York, N. Y.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
U. S. Nobby Cord, non-skid	.....	.....	.....	68.30	.....	84.90	110.40	2200	90	156.15	3000	100	201.15	4000	
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# Metal and Rubber Markets

## Marked Improvement in Orders. Automotive Industry is Buying

The steel producers, independents and the leading interest, have apparently made the last move in the direction of stimulation to trade by stabilizing the market and are waiting for the play of the consumers. The automotive industry has wakened up and is doing very well in line of bars and sheets. They are specifying freely upon their contracts and are placing a moderate amount of new tonnage. There is a general movement toward straightening the unevenness of present economic conditions, and with a gradual readjustment of prices apart from steel, the ferrous metal industry promises to improve proportionately.

### Steel Products Prices

Per ton—Pittsburgh—

Bessemer billets	37 00 a 38 00
Open hearth	37 00 a 38 50
Forging billets	42 00 a
Sheet bars	39 00 a
Slabs	36 00 a 38 50

### Sheets

The following prices are for 100-bundle lots and over f.o.b. mill:

Blue Annealed Sheets—

Pittsburgh (base)	3 00 a 3 10
Philadelphia	3 10 a 3 90
New York	3 38 a 3 48

Galvanized Sheets of Black Sheet Gauge—

Pittsburgh	5 00 a
New York	5 38 a

### Finished Iron and Steel

Tank plates, Pittsburgh	2 20 a
Tank plates, New York	2 58 a
Steel bars, New York	2 48 a
Steel bars, Pittsburgh	2 10 a

### Iron and Steel at Pittsburgh

Bessemer iron	26 96 a
Bessemer steel, f.o.b. Pitts.	37 00 a
Ferromanganese (80 per cent.)	90 00 a
Steel, melting scrap	13 50 a 14 50

### Miscellaneous Metals

OTHER METAL PRODUCTS—Following are current prices for brass and bronze products:

Copper sheets, not rolled	20 50 a 20 75
Copper bottoms	28 00 a 28 25
Seamless tubing, bronze	a
Seamless tubing, copper	22 00 a
Brazed tubing, brass	29 00 a
Brazed tubing, bronze	34 25 a
Brazed tubing, copper	34 25 a
Seamless high brass tubing	21 00 a
Seamless low brass tubing	23 00 a
Sheet zinc, f.o.b. smelter	11 00 a

ANTIMONY—The demand for antimony continued light and the market remains without special feature.

MANGANESE — Demand continues light, and manganese ore is offered at from 25c to 30c per unit on contract shipment.

OLD METALS—Aluminum clippings are in good demand. Casting and old sheets are neglected. There are no inquiries for any grade of copper scrap for the time being. The supplies in dealers' hands are very light and prices are strictly nominal. Lead is quiet.

Following are the dealers' buying and selling prices, f. o. b. New York:

Aluminum	Buying	Selling
Cast scrap	8 a 8½	9 a 9½
Sheet scrap	8 a 8½	9 a 9½
Clippings	12 a 13¼	15 a 16
Copper—		
Heavy machinery comp.	8 a 8½	9 a 9½
Light and bottoms	7 a 7½	8 a 8½
Heavy, cut and crucible	8½ a 9	9½ a 10
Brass, casting	5 a 5½	6 a 6¼
Brass, light	3 a 3¼	4 a 4¼
No. 1 clean brass turngs.	4 a 4¼	4½ a 4¾
No. 1 comp. turnings	6 a 6¼	7 a 7¼
Lead, heavy	3¼ a 3½	3¾ a 4
Zinc scrap	2 a 2½	3 a 3¼
Solder joints	5 a 5½	6 a 6¼
New zinc clippings	3½ a 4	4 a 4½

### Plantation Rubber Firm

Although there is very little buying interest at present, the plantation rubber market is showing resistance to the more bearish influences that have of late exerted a depressing effect upon sentiment. There are, for the time being at least, no anxious sellers and nothing is available at less than the quoted prices.

Para—Up-river, fine	a 17
Up-river, coarse	9½ a
Island, fine	a 17¾
Island, coarse	9½ a
Cameta	9 a
Plantations sm. ribbed sheets	16¾ a
Centrals—Corinto	7½ a
Esmeralda	7½ a
Mexican scrap	6 a
Guayule, wet	15 a 18
Guayule, dry	25 a
Balata, block, Trinidad	53 a
Balata, block, Columbian	38 a 39
Balata, Panama	36 a 37
Balata, sheet	65 a 68

SCRAP RUBBER—Extreme dullness prevails and there appears to be no market for anything on the list.

Tires, automobile	1 a
Inner tubes, No. 1	a 8
Inner tubes, No. 2	a 5

## Statement of Ownership, Management, Circulation, Etc.

Required by Act of Congress of August 24, 1912

Of COMMERCIAL CAR JOURNAL, published monthly at Philadelphia, Pa., for April 1, 1921.

State of Pennsylvania  
County of Philadelphia, ss.:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared James Artman, who, having been duly sworn according to law, deposes and says that he is the Editor of the COMMERCIAL CAR JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication, for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:  
Publisher CHILTON COMPANY, 49th & Market Sts., Philadelphia, Pa.  
Editor, James Artman, 4538 Chestnut St., Philadelphia, Pa.  
Managing Editor, Albert G. Metz, So. Ardmore, Pa.  
Business Manager, C. A. Musselman, 4203 Pine St., Philadelphia, Pa.
2. That the owners are:  
James Artman, 4538 Chestnut St., Philadelphia, Pa.  
George H. Buzby, Wellington Apartments, 19th & Walnut Sts., Philadelphia, Pa.  
C. A. Musselman, 4203 Pine St., Philadelphia, Pa.  
A. H. Vaux, Penlynn, Pa.
3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: None.
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders, who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JAMES ARTMAN, Editor.  
Sworn and subscribed before me this 4th day of April, 1921.

(Seal) HARRY SMITH.  
(My commission expires March 7, 1926.)



### Laminated Shim Company Moves

The Laminated Shim Co., manufacturers of Laminum for shims, moved on May 1st to their new plant and offices situated at 14th St. and Governor Place, Long Island City, N. Y. The building is of concrete and brick construction and the manufacturing space available totals 25,000 ft.

# When to Give is to Receive

## Pittsburgh Dealer Offers Services of Truck to Anyone Free of Charge During Week in Which It is Run Continuously as a Test

**J.** S. CONROY, being an aggressive motor truck dealer, is chuck full of ideas—ideas that vibrate with merchandising and advertising value. He has demonstrated, time and time again, his seemingly inherent appreciation of what appeals to the buying public. When he handled passenger cars, he was responsible for staging some of the most successful advertising stunts of his day. One of these, an automobile climbing a raised drawbridge, earned for his company a front cover picture on one of the country's national magazines and resulted in publicity in newspapers all over the country, the end of which did not come for almost a year.

Consequently, when Jim Conroy puts across an advertising idea that draws many prospects to his salesrooms, other motor truck dealers throughout the country might profit by staging something along similar lines.

J. S. Conroy is general manager for the Universal Auto Sales Corp., Master truck distributor and dealer in Pittsburgh, Pa. Last summer he conceived the idea

of giving one of his trucks an endurance test and at the same time offering the potential buyers in the city a chance to test the service of the truck, free of charge.

"Various stunts in the passenger car business has been tried," says Mr. Conroy, "and I realized the public were not interested in a lot of dry figures, and it was my object to promote something in which the public received some benefits.

So he went ahead with his endurance test.

His idea was to run a Master truck engine continuously for one week as a durability test, during which running he offered the services of the truck to anyone for any kind of hauling within the city limits, free of charge.

His first piece of advertising copy in the city newspapers told the story clearly and to the point.

The endurance test was started from the courthouse steps in the presence of the mayor and several prominent Pittsburgh officials, who witnessed the sealing of the hood. The run was completed in the presence of several newspaper men

and prominent automobile men, who testified as to the condition of the truck after its 168-hour run.

Regarding the interest the test aroused, Mr. Conroy says: "It was interesting and gratifying to note the general interest the public took in the test, and we received hundreds of calls for its use, which included wholesale houses, orphan asylums, baseball teams, boy scouts, and others too numerous to mention. The last day the truck was accompanied by a band, which attracted considerable attention.

"Following the run our show room was crowded with prospective buyers. In fact, they were so numerous, we were unable to get all their names or give them proper attention. We were able to trace eight sales directly as a result of this publicity, and we are thinking of a similar publicity campaign at this time, which we hope will net like results."

The test feature of the campaign appealed to the news editors of the city dailies, and the company received considerable helpful publicity through the editorial columns throughout the week of the test.

## New Silent Salesman Makes Hit in Boston

The "go-getter" type of dealer is ever on the lookout. He makes it a point to study ways and means for not only interesting his prospects, but by actually constructing special contrivances that he cannot but help want because of its adaptation to his business and its obvious money making qualities. Dealers of this character never want. The following story contains a thought.

A nine-foot cigar, facsimile of the original in every way, is attracting much attention in Boston as it goes up and down the main thoroughfares, smoking incessantly.

The cigar is mounted on top a standard Dodge Brothers car. In the interior of the car is concealed an arrangement for producing the smoke or vapor, which filters out slowly through perforations in the ashes. The effect is very realistic. The advertising value of the device is increased by the mystery of the steady flow of smoke, as there are apparently no pipes, hose or other connections between the cigar and the body of the car, except the flat iron braces, which are painted to be hardly recognizable.

The first of these cars was sold to Alles & Fisher, cigar manufacturers, by the Henshaw Motor Co., Dodge Brothers dealer in Boston. Henshaw holds patents on the contrivance, and already has created a demand which will undoubtedly

result in many other sales, as the car on which he mounts the cigar has always been a favorite with tobacco manufacturers and dealers.

Salesmen who drive the car say it never fails to make an impression on the retailer, and therefore assists materially in making sales. This is chiefly due to the fact

that the retailer likes to buy from a manufacturer who advertises extensively and this novelty is a good indication of unusual activity in that line.

The principle of the cigar is also being applied to other lines of business whose product is a smoke, steam or vapor producing article.



For an Attention-Inspiring Advertisement, the Monster Cigar Mounted on This Dodge Brothers Car, is Hard to Beat



# How About a Bus Line in Your Town?

**There Are Thousands of Towns in This Country That Need Motor Bus Transportation. The Aggressive Dealer Can Render the Town and Himself a Distinct Benefit by Promoting Such an Enterprise**

By T. J. FAY

**T**HE present motor car passenger vehicle, as used now throughout the United States, commonly known as the "jitney bus," is, I believe, to the future motor bus transportation what the old time five-cent picture house was to one of the greatest industries of the world—the present day moving picture theatre.

There are, perhaps, anywhere from fifteen to twenty thousand of these vehicles operating throughout the United States, charging anywhere from five cents up, and transporting millions of people to and from small towns and over various portions of cities and villages. Out of this great number of vehicles, over 95 per cent of which are owned by individuals, there are only a half dozen jitney or bus line companies or corporations that operate twenty or more vehicles.

## Stigmatized as an "Outlaw" Pursuit

This great business that has grown up like a mushroom, practically overnight, without any system, without the co-operation of any real business organizations, cities or communities, is, and has been since its inception more or less, and mostly more, of an outlaw operation. There is no real service to practically 95 per cent of the people carried over these lines, that is, no real system of reliable service operating on schedule. As a whole, these men operating such jitneys merely go where the traffic is the densest and when they have a load they carry their passengers to somewhere near a convenient point and then get out and hustle for another load.

Yet a careful analysis of the situation would show that they carry approximately two million people a day. Although their equipment is far from satisfactory, yet the needs of transportation throughout the United States are so great that they have become a necessity, and as in the case of all great enterprises or new movements, they are the pioneers of what will undoubtedly be the future method of intra-city and interurban transportation.

Dating back to the early stages of public transportation, we find that about every decade there has been a complete revolution in the methods applying to such transportation. The whole situation resolves itself into the fact that we are due for our periodical improvement; in fact, revolution, particularly of the intra-city transportation.

## Flexibility Prevents Accidents

Through the demonstrations of the motor bus and jitney operations we have shown two vital features; the first is that of the possibility of carrying passengers over practically any street in any city or town safely, or, at least, with a greater degree of safety, with a much less loss of life and limb, than has been done by cars operating over tracks, as it is a fact that when an obstacle looms suddenly ahead of a vehicle, a bus, with its flexibility, can be diverted from its course in most cases, thereby avoiding an impact. As we know that such transportation must be operated with speed and it takes a certain percentage of time to stop a vehicle, it has been proven that motor cars, whether they be truck or passenger cars, can be stopped in a much less distance than the street car. The street car, moreover, must go over its straight course until it has time to stop.

As an illustration of this, I would state that in my operations in the city of Rockford and its very close interurban territory, we have carried 1,224,000 people, perhaps one-third of the amount carried in this particular city during the year of 1920, with a loss of one life, which, by the way, is the first fatal accident in our operations of three and a half years, and covering a distance of five million miles. One other person sustained in an accident a broken nose and there were six minor accidents—in all a total of eight accidents. As against this the traction lines report thirty-eight serious accidents, with report of nine fatal accidents. This would disprove the theory that motor vehicles driven at random on congested streets would be a serious objection to that method of transportation. Secondly, the very fact that there are so many motor buses and motor cars operating with very few instances of scientific management would show they must have received sufficient remuneration out of this business to make such operations pay.

I would figure the only other important item in motor bus transportation necessary to make such lines a complete success is the comfort and real system of service that can be made possible through large systematized operations, where the equipment can be standardized, where there can be sufficient overhead maintained to properly dispatch and check such operations and it requires a large over-

head with departments of dispatching and checking, departments for proper care of mechanical construction, for washing, greasing and keeping the cars in a sanitary manner, garaging at one point and a most complete system of auditing, filing records for such operations.

Systems such as I have outlined here can be so built and operated successfully and so standardized that they will undoubtedly gain the confidence of the communities in which they operate.

## Many Opportunities for Bus Line

There are sections of every large city in the United States that are not and cannot be covered with practicability by traction lines due to varying conditions, leaving great openings for successful motor bus operations. And another, perhaps the most important field for immediate installation of such lines is the cities of 75,000 or less, where street car lines were installed twenty or thirty years ago and at that time the lines as laid out were adequate for such transportation; but, during the past twenty years these cities have been increasing their population—in most instances they have increased to double what they were at that time. The majority of such cities of that size today cover an area of about five miles in diameter and are practically round. When the tracks were laid in these cities, as a rule, such tracks were laid out to divide the city with about three lines, each crossing through the heart of the city from one extreme to another, leaving at the outer ridge of the cities a territory without transportation, of about two miles.

Of course, when the tracks were laid out, people built their homes and businesses along such lines; later on they built between these points, and today those people living in the center of that area must walk a mile to either street car line, and with little chance of success of ever having additional traction lines built that will give them a greater convenience or bring the street cars closer to their doors. Such situations are common—you can note them in every city in the United States, and with no relief in view from the traction lines. Such people, living in these communities, are demanding, and they have a right to demand, some method of better transportation facilities, and there is absolutely no answer except the motor bus service.

Eastern Farm Analysis

(Continued from page 17)

not be used or for which the trucks were not suitable, and such hauling would amount to only a small percentage of the total. The size of loads and distance hauled with horses are approximately the same as given in Tables IV to VII.

Hauling on the Farm With Trucks

Of 416 men who reported on the use of their trucks for hauling on the farm, i. e., in the fields and around the buildings, 294, or more than 70 per cent, stated that they do not use their trucks at all for such work. The reasons for not using the truck for hauling on the farm were not given in every case, but a large number stated that their trucks were not suitable for such work. The smaller trucks in many cases will not carry as large loads as it is desired to haul, often the truck can not obtain traction in the fields, and sometimes the body with which it is equipped is not suitable for some of the hauling on the farm.

Many others stated that they used their horses for all hauling on the farm because there was no advantage in using the truck for such work. Most of the time required for hauling on the farm is taken up with loading and unloading, and the percentage of the total time which will be saved by the truck when used for such work is small as compared with the time it will save in road hauling. When there are horses on the farm which would otherwise be idle, it would naturally be more profitable to use the horses and let the truck stand idle if there is no advantage in time saved or convenience in using it.

The reasons for using their trucks, as given by 122 men who reported that they did some hauling on their farms with their trucks, are summarized in Table X. Practically all of this hauling was either crops or fertilizer, including lime and manure. The average length of haul for 94 of these men who reported on hauling crops was 148 rods, and for 40 who reported hauling fertilizer it was 149 rods. The average size of all the farms included is only 173 acres (see Table I), and 149 rods is considerably greater than the average distance which crops and fertilizer are usually hauled on such farms.

Reason for Using Truck	Number Reporting	Per Cent of Total
Time Saved.....	78	64
Convenience.....	22	18
Horses busy.....	13	11
Other.....	9	7

Table X. Reason for Using Truck for Hauling on the Farm

Sixty-four per cent of the 122 men reporting gave the saving of time as the reason for using their trucks for this work. A truck will save some time over horses on hauls of this distance if the truck body is suitable for carrying the material to be hauled, and if there is no difficulty in obtaining traction in the fields. It may also save time to use the truck when only one

or two loads are to be hauled, and the horses and wagons are not ready for use.

Custom Hauling

While all the men whose reports are included use their trucks primarily for hauling to and from their own farms, about 28 per cent reported that they did some custom work during the year preceding the time of reporting. Of 492 farmers who reported concerning custom work 355 said that during the past year they had done none whatever. The remaining 137 had received on the average \$174 for such work.

About 30 per cent of these men who had done custom work stated that it had not been profitable. Many of them stated that the main reason for doing custom work was to accommodate their neighbors, and ordinarily in such cases the price was not high enough to make the work profitable. Most of the custom work reported was done by men owning large or medium sized trucks. Only seven of the men who own half-ton trucks reported that they did any custom work, and the average amount received by the seven for the work which they did during the past year was \$53.

Effect of Different Kinds of Roads on Use of Trucks

It has been shown that the majority of these farmers considered poor roads the greatest disadvantage in the use of a motor truck, and that most of those who will use horses for part of their road hauling do so because of poor roads. In order to gain a more definite idea of the effect of the kind of roads on the use of motor trucks, each farmer was asked to specify the kind of roads over which his truck traveled and the number of weeks during the past year the roads had been in such condition on account of mud or snow that the truck could not be used.

All kinds of roads, from unimproved dirt roads to high-class state highways, were reported. Twenty-nine per cent of the men who reported on this point stated that their trucks ordinarily travel only on dirt roads, 46 per cent stated that the roads which they ordinarily use are part dirt and part improved, and the remainder stated that they have all improved roads, either macadam, gravel, or better.

On the average, there were 10.7 weeks when the men with all-dirt roads could not use their trucks, 7.8 weeks when those with part-dirt roads could not use them, and 3.5 weeks when those with wholly improved roads could not.

In all, less than 25 per cent of the men found it possible to use their trucks every week in the year, and between 35 and 40 per cent reported that there were more than 8 weeks during the year when they could not use their trucks. About one-half of the men with wholly improved roads stated that they could use their trucks any time during the year, but only 9 per cent of those with all-dirt roads were able to do so, and there were more than 8 weeks during the year when 55 per cent of these men with all-dirt roads were

unable to use their trucks. Snow was doubtless the main factor in making the roads impassable for the 81 men who have improved roads only, but who found there was at least one week during the year when they were not able to use trucks.

The kind of tires with which the trucks are equipped apparently has little to do with the amount of time which they can not be used on account of the roads. That there was no apparent relation between the character of the roads and the different kinds of tires, and no great difference in the length of time during which the condition of the roads prevented use of trucks with different kinds of tires, is shown by the following:

- Of 222 owners of pneumatic-tired trucks—

69 have all-dirt roads  
96 have part-dirt roads  
57 have no dirt roads

On the average there were 7.9 weeks during the year when the condition of the roads prohibited the use of the trucks.
- Of 211 owners of solid-tired trucks—

47 have all-dirt roads  
98 have part-dirt roads  
66 have have no dirt roads

On the average there were 6.4 weeks during the year when the condition of the roads prohibited the use of the trucks.
- Of 211 owners of trucks with pneumatic tires in front and solid tires behind—

71 have all-dirt roads  
104 have part-dirt roads  
36 have no dirt roads

On the average there were 8.6 weeks during the year when the condition of the roads prohibited the use of the trucks.

Seven out of 69 men whose trucks are equipped with pneumatic tires and who have dirt roads only, and 4 out of 47 whose trucks are equipped with solid tires and who have dirt roads only, stated that there was less than a week during the year in which they could not use their trucks.

It does not necessarily follow that horses were always used for hauling when the roads were in such a condition that the trucks could not be used, as on at least a part of these farms no hauling was necessary at such times.

Change of Market

Each truck owner was asked to give the name of the town where his produce was usually marketed before the purchase of the truck, and its distance from the farm. He was also asked to give the name of the town where the produce hauled by the truck is usually marketed and its distance from the farm. Answers of 704 men to these questions show that about one-fourth of them have changed their markets since purchasing their trucks. The exact number of men on each type of farm who answered the questions concerning their markets, the number who changed markets, and the average distance to the new markets is given in Table XII.

Type of Farming	Number of Estimates	Days Per Year on Which Truck is Used
Truck.....	133	160
Dairy.....	109	244
Fruit.....	99	159
Crop.....	43	127
General.....	255	162
All.....	639	173

Table XII. Change of Market After Purchase of Motor Trucks



A somewhat smaller percentage of dairy farmers than of any other type changed their markets. When milk is hauled to a condensery or to a station for shipment it is not often that one market or station is enough better than another to warrant a change.

A large percentage of these men who have changed their markets stated that they did so because the new market was better than the old one. A few, however, stated that they changed for other reasons, several saying that the better roads between their farms and the markets they are now using were responsible for the change. It should be remembered that a considerable number of the men who have not changed their markets were using first-class markets before purchasing their trucks.

The fact that a man has changed his market does not necessarily mean that all his produce is hauled to the new market, or that he purchases all the material for his farm at the new market. In fact, a considerable number of these men still haul some material either to or from the old markets.

Before purchasing their trucks the operators of 75 per cent of these farms used markets less than 10 miles from their farms, but now over 80 per cent of them are using markets 10 miles or more from their farms. The average distance to the old market was 7 miles, and the average distance to the new market is 20 miles.

Seventy-one of these 156 men now use markets which are 20 miles or more from the farm. Of the entire 704 men who reported concerning their markets only 164 are now using markets which are 20 or more miles from the farm. Thus over 40 per cent of the men who now use markets which are such a great distance from their farms have changed markets since purchasing their trucks.

#### Annual Use of Trucks

The number of miles per year which a motor truck travels has a direct bearing upon the cost per mile run or per ton hauled. Depreciation, interest, and repair charges appear all more or less independent of the number of miles which the truck travels per year, and the greater the number of miles traveled per year, or the greater the amount of material hauled, the less will be the charge per mile or per ton hauled for these items.

The average of the estimates of 553 men is 3,820 miles, but 53 per cent of the estimates were 3,250 miles or less.

The amount of material hauled from and to the farm, which depends on the type of farming and the size of the farm; the size of load, which depends on the size of the truck; and the length of haul, all have an influence on the distance per year which a truck travels, but for the farms under consideration these factors are all correlated in such a way that no one of them exerts a predominating influence. For instance, the average of the estimates of the number of miles per year traveled by the trucks on the farms of different types is as follows:

	Miles
108 trucks farms.....	3,800
93 dairy farms.....	3,960
89 fruit farms.....	3,980
36 crop farms.....	3,240
227 general farms.....	3,800

Similarly, the size of the truck and the distance from the farm to market show very little relation to the number of miles traveled per year.

These farmers were also asked for their estimate of the number of days per year on which they used their trucks—not the number of full days work per year which the truck did, but simply the number of days on which some use was made of it. The average of the estimates of the number of days per year on which some use is made of the trucks on farms of different types is shown in Table XIII. The dairy

Type of Farming	Number Reporting	Number Who Changed Market	Average Distance to New Market
			Miles
Truck.....	139	31	18
Dairy.....	119	18	16
Fruit.....	102	23	27
Crop.....	44	12	22
General.....	300	88	19
All.....	704	172	20

Table XIII. Days Per Year on Which Trucks Were Used

farmers use their trucks on the most days and the crop farmers on the fewest. The estimates also showed that in general the smaller trucks were used on a somewhat greater number of days than were the larger ones.

#### Life and Depreciation of Trucks

The average first cost, average life, and average depreciation per year and per mile traveled for trucks of  $\frac{1}{2}$  to 2 tons in size are shown in Table XIV. There were so few reports on trucks over 2 tons in size that no figures for them have been included.

Size of Truck	$\frac{1}{2}$ -Ton	$\frac{3}{4}$ -Ton	1-Ton	$1\frac{1}{4}$ and $1\frac{1}{2}$ Ton	2-Ton
First cost.....	\$574(149)	\$1,269(94)	\$900(342)	\$1,731(67)	\$2,366(9)
Extra equipment.....	26(116)	37(66)	50(289)	111(59)	99(58)
Total cost.....	600	1,306	959	1,842	2,465
Present age (years).....	2.7(150)	2.3(95)	1.6(344)	2.1(67)	2.5(79)
Remaining life (years).....	3.9(94)	4.8(56)	4.7(196)	5.1(40)	5.4(48)
Total life (years).....	6.6	7.1	6.3	7.2	7.9
Annual depreciation.....	\$91	\$184	\$152	\$256	\$312
Miles traveled per year.....	3,790(113)	4,370(80)	3,660(232)	3,100(232)	4,070(60)
Depreciation per mile of travel.....	\$0.024	\$0.042	\$0.041	\$0.083	\$0.077

Table XIV. First Cost, Life, and Depreciation Charges for Trucks of Different Sizes

The quoted price of the truck often does not include some equipment which it is necessary or desirable to have, and each

and for tires in Table XVII shows that for each size the depreciation charge is greater than the cost of fuel and oil, and

Present Age (Months Owned)	Size of Truck				
	$\frac{1}{2}$ -Ton	$\frac{3}{4}$ -Ton	1-Ton	$1\frac{1}{4}$ and $1\frac{1}{2}$ -Ton	2-Ton
	Average Total Expense for Repairs				
12 and less.....	\$9	\$20	\$14	\$2	\$19
13 to 24.....	36	42	49	28	112
25 to 36.....	51	116	65	89	143
37 and over.....	136	191	155	127	444

Table XV. Average Repair Costs of Trucks of Different Sizes and Ages

# ROSS STEERING GEARS

**Easy Steering Increases Efficiency, Reduces Delivery Costs, Makes Satisfied Owners**

The real efficiency of a motor truck depends very largely upon the ease with which it can be handled. This is one of the most vital of all considerations for the man who buys a truck, or for the manufacturer or dealer who sells it. Ease of handling, in turn, depends essentially upon the steering gear with which it is controlled.

Ross Steering Gears, with their enormous bearing surfaces, mean an easier day's work for the driver, and at the same time a bigger return to the employer in greater service from both the truck and the man who drives it. This increased efficiency reduces delivery costs and makes satisfied owners.

In order to insure their customers of the easy steering, the safety and the reliability which Ross Steering Gears guarantee, 178 motor truck manufacturers are now using them as standard equipment. They know that Ross Steering Gears mean contented drivers and satisfied owners.

*Write for any further information desired*

**ROSS GEAR & TOOL COMPANY**  
760 HEATH STREET, LAFAYETTE, INDIANA, U. S. A.

**The Steering Gears that Predominate on Motor Trucks**



for the larger sizes it is greater than the combined costs of fuel, oil, and tires.

Repairs

Each truck owner was asked to report the amount he had spent for repairs since the purchase of his truck. A summary of the replies for trucks of different sizes is given in Table XV.

In all, 40 per cent of the men who had not owned their trucks 12 months had spent nothing on them for repairs. However, very few of those who had owned their trucks for more than 12 months had been free from expense for repairs.

The average age of the trucks which had been owned 37 months or more was not far from 4 years, and on this basis the average annual repair costs for the first 4 years of these trucks' lives were approximately \$35 for the 1/2 ton trucks, \$50 for the 3/4 ton, \$40 for the 1 ton, \$35 for the 1 1/4 ton and 1 1/2 ton, and \$110 for the 2 ton. It is apparent that these figures are too low for the average annual repair cost for the entire life of the machines, but since none of the machines reported on were entirely worn out it is impossible to obtain accurate figures for this item. In the absence of accurate figures, allowances of \$50 per year for the 1/2 ton trucks, \$75 for the 3/4 ton trucks, \$75 for the 1 ton trucks, \$100 for the 1 1/4 ton and 1 1/2 ton trucks, and \$150 for the 2 ton trucks, have been made as fair charges for the average annual repair costs in figuring the cost of operation in Table XX.

Gasoline and Oil

The average number of miles obtained per gallon of gasoline and per quart of cylinder oil by the men who use trucks of different sizes are shown in Table XVI. The average price which these men paid for gasoline at the time they made their reports (January and February, 1920), was 27 cents per gallon, and the average price of lubricating oil was 65 cents per gallon. The costs per mile traveled are computed from these figures. No attempt was made to learn the amount and value of the grease used, but in any case its value should be only a fraction of that of the lubricating oil.

Size of Truck	Gasoline			Oil			Total Cost per Mile for Gasoline and Oil
	Miles per Gallon	Number of Reports	Cost per Mile	Miles per Quart	Number of Reports	Cost per Mile	
1/2-Ton.....	14.8	138	\$0.018	59	93	\$0.003	\$0.021
3/4-Ton.....	12.1	92	.022	58	71	.003	.025
1-Ton.....	11.2	332	.024	48	281	.003	.027
1 1/4 and 1 1/2 Ton.....	9.5	64	.028	49	54	.003	.031
2-Ton.....	8.0	75	.034	40	62	.004	.038

Table XVI. Gasoline and Oil Requirements of Trucks of Different Sizes (Gasoline at Twenty-seven Cents Per Gallon; Lubricating Oil at Sixty-five Cents Per Gallon)

Tires

Each man was asked to state what he paid for tires and the mileage obtained. The cost per mile for tires as shown in Table XVII is figured by simply dividing the average cost per tire by the average number of miles which the tire runs, and multiplying this result by four to obtain the cost for four tires. According to the estimates of 318 men, the pneumatic tires

on these trucks run an average of 4,500 miles, and according to the estimates of 206 men the solid tires run an average of 8,200 miles.

An allowance for the mileage obtained from the tires with which a machine is equipped when purchased must be made in order to determine the net tire cost to the user, as the cost of the first set of tires is included in the purchase price of the truck.

According to the estimates of these men the percentage of the total mileage of the trucks obtained from the tires with which they are equipped when purchased is as follows:

Pneumatic tires on the 1/2 ton trucks run 18 per cent of the total mileage  
Pneumatic tires on the 3/4 ton trucks run 17 per cent of the total mileage  
Pneumatic tires on the 1 ton trucks run 19 per cent of the total mileage  
Solid tires on the 1 ton trucks run 36 per cent of the total mileage  
Solid tires on the 1 1/4 and 1 1/2 ton trucks run 40 per cent of the total mileage  
Solid tires on the 2 ton trucks run 26 per cent of the total mileage

The cost per mile as indicated by the cost of the tires and miles which they run has been reduced by these percentages in order to obtain the net cost per mile traveled. No attempt was made to obtain the cost of inner tubes for pneumatic tires or to obtain the cost of tire repairs sep-

Size of Truck	Kind of Tires	Cost per Mile	Number of Reports	Allowance for Tires on Machine when Bought	Net Cost per Mile
1/2-Ton.....	Pneumatic.....	\$.020	113	\$0.004	\$0.016
3/4-Ton.....	do.....	.035	47	.006	.029
1-Ton.....	do.....	.020	151	.004	.016
1-Ton.....	Solid.....	.020	94	.007	.013
1 1/4 and 1 1/2-Ton.....	do.....	.029	20	.012	.017
2-Ton.....	do.....	.034	25	.009	.025

Table XVII. Tire Costs

arately from the entire repair costs of the trucks.

Kind of Tires Recommended by Users

The kinds of tires which 637 men with trucks of all sizes are now using, together with the kinds they prefer, are as follows:

Of 231 men who use pneumatic tires—  
230 prefer pneumatics  
1 prefers pneumatics in front and solids in rear  
Of 209 men who now use solid tires—  
16 prefer pneumatics  
192 prefer solids  
1 prefers pneumatics in front and solids in rear  
Of 197 men who now use pneumatics in front and solids in rear—  
75 prefer pneumatics  
67 prefer solids  
55 prefer pneumatics in front and solids in rear

In all, 36 per cent now use pneumatics, 33 per cent use solids, and 31 per cent use

pneumatics in front and solids in the rear, while 50 per cent prefer pneumatics, 41 per cent prefer solids, and only 9 per cent prefer pneumatics in front; solids in rear.

Reliability

The reliability of a motor truck, as that of any other machine, has a very decided effect upon its profitability. If a truck is out of commission for several days at a time when its services are needed and when its owner is depending upon it to help him through a busy time it can scarcely be considered a profitable machine for him to own. Likewise, if a great deal of time is lost on the road on account of motor and tire trouble, breakage, and other delays, this loss and annoyance may overcome all the advantages attending its use. In order to obtain information as to the reliability of motor trucks for farm use these truck owners were asked to give both the number of days their trucks had been out of commission when needed during the past year, and the percentage of the time lost while using them. The average number of days, 682 trucks of different ages were out of commission during the year preceding the time of reporting is 1.7. There is practically no difference in this respect among the trucks of different sizes.

Seventy-one per cent of the trucks had not been out of commission at all when needed, 20 per cent had been out of commission 5 days or less, 6 per cent had been out of commission from 6 to 10 days, and 3 per cent had been out of commission over 10 days. In general, the newer trucks are more reliable than the older ones. While nearly 85 per cent of the trucks which had been owned 12 months or less had not been out of commission when needed, only a little more than one-half of those which had been in use more than 3 years had not been out of commission during the preceding year.

The average percentage of time lost on account of motor and tire trouble, breakage, etc., by 542 men owning trucks of different ages is shown in Table XIX.

Age of Truck (Months)	Number of Reports	Average Per Cent of Time Lost
12 and less.....	155	0.6
13 to 24.....	190	1.1
25 to 36.....	120	1.6
37 and over.....	77	1.6

Table XIX. Per Cent of Time Lost by Trucks of Different Ages on Account of Motor and Tire Troubles, Breakage, Etc.



**SKF**  
Research Laboratory  
established at Phila-  
delphia to co-operate  
with the Gothenburg  
Laboratories in the  
study of the Ameri-  
can Manufacturers'  
friction problems.

**T**HE technical advice brought you by our engineers embodies the experience of highly trained organizations in all parts of the world in the solving of friction problems.

This international experience is both technical and practical and is acquired in co-effort with the best international research endeavor.

**SKF** service in America is linked to this international experience. Its tangible evidence is found in products marked "**SKF**" and in the advice supplied you by our engineers.

**SKF Industries, Inc.**  
165 Broadway, New York City

Supervising  
at the request  
of the stock-  
holders.

The Hess-Bright Manufacturing Co.  
Skayef Ball Bearing Co.  
Atlas Ball Co.  
Hubbard Machine Co.  
**SKF Research Laboratories**

**SOUTHERN OIL & FEED MILLS, INC.**  
MILLS  
PETERSBURG, VA. - SUFFOLK, VA.  
PRINCIPAL OFFICE  
**PETERSBURG, VA.**  
Codes Used (ASC-STANDARD IMPROVED  
WORKS-7TH ED. REV.  
ROBINSON-REVISED)  
March 26, 1920.

SKF Industries,  
165 Broadway,  
New York City.

April 23, 1920.

Gentlemen:

Attention Chief Engineer

We wish to thank you, and to say that we appreciate highly your sending \*\*\*\*\* here to assist us with the trouble we were having with ball bearings in our mill. Mr. \*\*\*\*\* we believe, has made us some very valuable suggestions, and we believe, his visit to us is going to prove most profitable. We wish also to thank you for your promptness in forwarding the two 6516 bearings, which came in very promptly.

It is indeed a pleasure to have business relations with a concern that chooses such a policy, as you have shown to us in this instance.

Again thanking you most cordially, we are

Yours very truly,

SOUTHERN OIL & FEED MILLS, INC:

BY: (Signed) *[Signature]*

619



**SKF**

Among these products now offered are:

Single row deep groove ball bearings. Thrust bearings. Steel balls.  
Double row self aligning ball bearings. Transmission equipment.



The newer trucks are more reliable in this respect, just as they are in respect to the amount of time they are out of commission when needed. Eighty per cent of the men whose trucks have been in use 12 months or less stated that they lost no time, and only one-half of the men whose trucks have been in use more than 3 years stated that they lost no time. In all, 67 per cent of the total stated that they had lost no time, and only 1 man in 26 stated that more than 5 per cent of the time was lost on this account.

To a certain extent the reliability of a motor truck depends upon the ability of the operator and the care which the truck is given. Roughly, about 60 per cent of these trucks are operated by their owners, about 30 per cent by the sons of the owners, and about 10 per cent by hired men. Automobiles are owned on about three-fourths of the farms and tractors on about one-fourth of them. It is to be expected that the owner of such an expensive machine as a motor truck, or any member of his family, would give it a reasonable amount of care and operate it with a reasonable degree of intelligence, and the fact that automobiles or tractors were owned on a large percentage of these farms indicates that most of the operators were more or less skilled in the operation of gas engines. That such a large percentage of these trucks were operated without any loss of time and were always ready for work when needed is very probably partially due to these facts.

Cost of Operation

The cost of operating trucks of different sizes reported by these men is shown in Table XX. The items considered in making up these costs are depreciation, repairs, interest on investment, registration and license fees, cost of gasoline and oil, and of tires.

The figures for annual depreciation are obtained from Table XIV; those for an-

mining the average investment in equipment where a fraction of the first cost is charged off each year for depreciation. The interest charge when computed on this basis is slightly greater than when computed on one-half of the first cost.

Registration and license fees vary considerably in the different states. No attempt was made to determine the exact average of the fees paid by the different men. The amounts used as shown in the table are, however, representative of such fees for the year 1920 in the Eastern States, and include both the registration of the truck and the operator's license. In nearly every instance these amounts are within \$5 of the actual fees charged in the different states.

No charge has been made for taxes, insurance, housing, or labor spent in caring for the truck. However, these items would ordinarily amount to a very small percentage of the total cost.

The number of miles traveled per year are shown in a preceding paragraph. The gasoline and oil charges are obtained from Table XVI, and the tire charges from Table XVII. The tire charges for the 1/2 ton, 3/4 ton, and 1 ton trucks are for pneu-

The charge for the driver is obtained by allowing a rate of 50 cents per hour for his time while driving and while loading and unloading the truck. The average time required for hauling different materials as given in Tables IV to VII is 0.14 hour per mile of travel for the 1/2 and 3/4 ton trucks, and 0.15 hour for the 1, 1 1/4, 1 1/2, and 2 ton trucks.

It is stated in a preceding paragraph that these men had return loads for their trucks about 26 per cent of the time; that is, each truck hauls loads both ways on 26 out of every 100 round trips it makes from and to the farm, and runs without a load 74 one-way trips. The cost of operating the truck and the value of the driver's time for these 74 trips with no load must be charged to the 126 trips with loads, in order to obtain the actual cost per mile of haul. That is, every 126 miles of haul must bear the expense of 200 miles of travel, or every 63 miles of haul must bear the expense of 100 miles of travel. The cost per mile of haul as given in the table is obtained by multiplying the total cost per mile traveled by 100 and dividing the product by 63.

The cost per ton-mile hauled is deter-

Size of Truck	1/2-Ton	3/4-Ton	1-Ton	1 1/4 and 1 1/2-Ton	2-Ton
Truck cost per mile run.....	\$0.082	\$0.127	\$0.119	\$0.190	\$0.203
Charge for driver per mile run.....	.070	.070	.075	.075	.075
Total.....	.152	.197	.194	.265	.278
Cost per mile of haul (37 per cent idle running).....	.241	.313	.308	.421	.441
Cost per ton-mile for hauling crops.....	.502	.338	2.58	.242	.179

Table XXI. Cost of Hauling With Trucks of Different Sizes

matic tires, while for the 1 1/4 ton, 1 1/2 ton, and 2 ton trucks the tire charges are for solid tires.

Cost of Hauling With Trucks

The cost of hauling with a motor truck is determined by the cost of operating the

mined by dividing the cost per mile hauled by the weight of the load in tons. As shown in Table IV, the average weight of a load of crops hauled with 1/2 ton trucks is 0.480 ton; for 3/4 ton trucks the load is 0.926 ton; for the 1 ton trucks, 1.196 tons; for 1 1/4 ton and 1 1/2 ton trucks, 1.734 tons; and for the 2 ton trucks, 2.464 tons. The costs per mile of haul for the trucks of different sizes divided by these figures give the costs per ton-mile.

Saving of Hired Help

The saving of time is given by these men as the greatest advantage in the use of a motor truck, but the saving of time will not be of any financial benefit to a farmer unless he uses the time thus saved on other work, or unless it enables him to reduce the expense for hired help.

Of 711 men who answered the question as to whether the truck reduces the expense for hired help, 562, or 79 per cent, said that it does, and the remaining 149 that it does not.

Three hundred and fifty of the 562 estimated the amount thus annually saved, and the average of these estimates is \$324. This figure can scarcely be taken to represent the actual amount which the labor bills of these men have been reduced since purchasing their trucks, but rather as their estimates of the amounts by which their bills would be increased if they did not now own trucks, and if they were doing the same amount of work they are now doing.

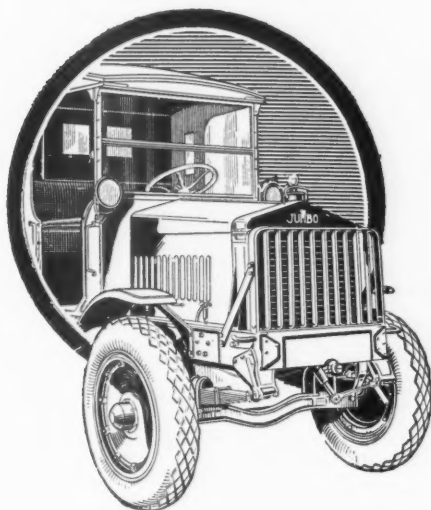
	Size				
	1/2-Ton	3/4-Ton	1-Ton	1 1/4 and 1 1/2 Ton	2-Ton
Fixed charges:					
Annual depreciation.....	\$91	\$184	\$152	\$256	\$312
Annual repairs.....	50	75	75	100	150
Annual interest.....	21	45	33	63	83
Annual registration and license fees.....	10	15	18	22	26
Total fixed charges.....	\$172	\$319	\$278	\$441	\$571
Miles traveled per year.....	3,790	4,370	3,660	3,100	4,070
Fixed charges per mile.....	\$0.045	\$0.073	\$0.076	\$0.142	\$0.140
Gasoline and oil per mile.....	.021	.025	.027	.031	.038
Tires per mile.....	.016	.029	.016	.017	.025
Total cost per mile.....	.082	.127	.119	.190	.203

Table XX. Cost of Operating Trucks of Different Sizes

nual repairs are given under the heading of "Repairs."

Interest is figured at 6 per cent on the average investment. The average investment has been found by the rule: Average investment = first cost  $\times \frac{\text{years of service} + 1}{\text{years of service} \times 2}$ . This is the generally accepted method for deter-

truck, the charge for the driver's time and labor, the size of load hauled, and the percentage of time the truck runs without a load. In Table XXI are given the cost per mile of haul, and the cost per ton-mile of hauling crops with trucks of different sizes. The cost of operating the truck is taken directly from the preceding table.



## Will You be Ready for the Turn?

The clouds are lifting—there is every indication of a distinct improvement in business conditions. With improvement will come an accelerated demand for every kind of manufactured product—and the motor truck industry will share largely in the fast-coming revival of buying.

Now is the time to analyze *your* situation. Will you be *ready* for the turn? Are you handling a complete line of dependable trucks? Can you count on your line for an expanding, profitable volume of business as conditions improve?

If you have the Jumbo franchise, you *are* ready for the turn. Today, the Jumbo line offers every dealer a splendid opportunity to cash in on the mounting demand for motor trucks. Built by a sound, responsible organization Jumbo Trucks always come through. Many Jumbo owners, with records of 20,000 to 30,000 miles—all kinds of loads over all kinds of roads—have not replaced a single part in nearly four years' hard service. There isn't a single dissatisfied Jumbo owner in all the world that we know of.

This reliability and low operating cost of Jumbo Trucks makes money for Jumbo owners—both will make money for you. The complete Jumbo line—ten models in six sizes—enables Jumbo dealers to serve all requirements with one make of truck, one high-quality standard in every size. *Will you be ready for the turn?*

*It will pay you to investigate the  
Jumbo profit plan. Write for it today*

NELSON MOTOR TRUCK COMPANY, *Saginaw, Michigan*





Eighty-four per cent of the operators of fruit farms think that their trucks reduce the expense for hired help. This is a slightly higher percentage than is reported for any other type of farming. The average of the estimates of those of this 84 per cent who attempted to place a value on the amount of help saved is \$364.

The owners of the larger trucks make higher estimates of the amount that their trucks reduce expenses than do owners of the smaller ones. The averages of the estimates of the owners of the  $\frac{1}{2}$  ton,  $\frac{3}{4}$  ton, and 1 ton trucks, who report that their trucks reduce the bill for hired help, were all between \$250 and \$300, the average of the estimates of the owners of the  $1\frac{1}{4}$  ton and  $1\frac{1}{2}$  ton trucks was between \$375 and \$400, while the estimates of the owners of the 2 ton trucks and of those over 2 tons averaged more than \$600. There is no great difference in the percentages of the owners of the different sizes who consider that their trucks do not reduce the expense for hired help.

#### Displacement of Horses

The operators of 610 farms reported the number of head of work stock they owned before purchasing their trucks and the number they had disposed of since that time. Four of these 610 farms were small ones which had been operated without horses even before trucks were purchased. The number of head of work stock kept on the other 606 farms varied from 1 or 2 on the smaller farms to 20 and more on a few of the larger ones. The total number of work stock kept on the 606 farms were

3,103. On 296 of them the number had been reduced since the trucks were purchased by a total of 586 head, an average reduction of 19 per cent for the 606 farms and an average displacement of 1.0 head per truck.

A man with only 1 or 2 horses will usually need to keep them for work on the farm even after buying a truck, and only about 1 man in 7 who owned 1 or 2 horses had sold any since buying his truck. Similarly, the purchase of a motor truck will not often enable a man who owns 3 or 4 horses, all of which he sometimes uses as a single unit, to reduce the number of his work stock. A little less than one-half of the men who had owned 3 or 4 horses before purchasing their trucks reported that they had disposed of any since that time, but nearly two-thirds of those who had owned 5 or more had disposed of at least 1 after purchasing the truck.

#### Farms on Which Tractors Are Owned

Of 675 men who reported on whether or not they own tractors, 180, or 27 per cent, stated that they own tractors. Tractors are owned on a larger percentage of the crop and fruit farms than on farms of other types. They are owned on 9 per cent of the truck farms, 33 per cent of the dairy farms, 38 per cent of the fruit farms, 42 per cent of the crop farms, and 25 per cent of the general farms. Size of the farm, however, evidently had a greater influence in this regard than did the type of farming.

Over two-thirds of the 675 farms consisted of not over 120 crop-acres. Trac-

tors are owned on only about 15 per cent of such farms, while they are owned on 55 per cent of those with more than 120 crop-acres. In most cases the reports did not show the size of the tractor owned, but at least a part of the tractors owned on the 21 farms with 60 or less crop-acres are small ones of only one or two drawbar horsepower, and are capable of doing the work of only about one horse.

The ownership of both motor trucks and tractors, even on the large farms, has not resulted in a very great reduction in the number of horses. The men who own both trucks and tractors and who have from 61 to 120 crop-acres still keep nearly 4 horses on the average—one horse for each 24 crop-acres—and only 6 of them are farming with fewer than 3 horses. The men who have from 121 to 180 crop-acres still keep an average of 5 horses—one for each 30 acres—and only six of them are now farming with fewer than 4 horses. The men who have over 180 crop-acres keep an average of between 8 and 9 horses—one to each 39 crop-acres—and only 3 of them are farming with fewer than 4 horses.

The number of crop-acres per horse on the farms of different sizes where trucks are owned, but no tractors, is only about 2 acres less in each case than on the farms where tractors are owned, there being 22 crop-acres per horse on the farms with 61 to 120 crop-acres where tractors are not owned, 28 per horse on those with 121 to 180 crop-acres, and 37 per horse on those with over 180 crop-acres.

### How Transportation Has Progressed in India

Mackintosh Burn, Ltd., of Calcutta, India, who have been in the building and contracting business at Calcutta for 15 years, experienced during that period, three distinctly different modes of transportation. The three different methods are clearly depicted in the accompanying illustration. This concern first relied upon man power to carry their building material. Each man would carry 100 pounds of brick upon his head in the baskets shown lying at their feet in the picture, and when these men were replaced by the ox carts it was considered that great progress had been made toward more efficient and economical transportation. For a long time the oxen held sway, for it only took one driver and four men to load and unload the carts which did the same work that previously required 15 or 20 men.

It was when this builder and contractor placed the first Wichita trucks in service that he realized a still greater advance had been made in his transportation facilities and greater economy and efficiency had been effected. Because of the extremely slow speed of the buffalo team and the time required for unloading, it was found one dump truck could do the work of 20 carts. Because of the dumping feature of the truck body no labor was required to unload the brick, and the only time the brick was handled was in the loading.

Each of the six Wichita  $3\frac{1}{2}$ -ton trucks which Mackintosh Burn, Ltd., operate replaced twenty buffalo carts and 100 men, each of which in its day of supremacy had taken the jobs of 15 or 20 men. Today each truck is accomplishing the same results that were accomplished 15 years ago by 300 men.

A common laborer in India is paid one rupee per day, which would amount

to about 40 cents of our money. A daily payroll of \$120 would be required to maintain a crew necessary to do the work of one truck, even at the extreme low wage of 40 cents per man. The daily operating cost of each  $3\frac{1}{2}$ -ton truck is approximately  $37\frac{1}{2}$  rupees (\$15) and the large saving which the trucks effect accounts for the rapid use of trucks in most foreign countries.



Depicting Three Modes of Transportation; From Primitive to Modern



### Mr. Albert Fisher Follows Inveterate Ideals In Building Standard Trucks

**A**LL the craft of ancient commercial vehicle building is practiced and applied by Mr. Fisher and the group of inspired craftsmen who have, for many years, fervently co-operated with him in making Standard Motor Trucks.

Working with matchless units, the cream of automotive part specialists, Mr. Fisher and his fellow associates go about their task of constructing and fitting each external and internal part of Standard Motor Trucks with all the skill and the pride that long experience has developed in them.

Each unit of Standard Trucks—the frame, front and rear axles, steering gear, engine, transmission, universal joint and propeller shaft assembly, brakes, controls, radiator, wheels, and guards, is carefully and patiently fitted with a slow, measured turn of the wrench. Each mechanical factor, even the most trifling detail, is related and co-ordinated with this infinite care.

Most of the men who have helped to make the Standard Motor Truck the product of real usefulness that it is today, have been with Mr. Fisher for ten, twelve, fifteen, seventeen years and longer. They have become imbued with the conscientious manufacturing

ideals and the attributes of character that have attained wide recognition for Mr. Fisher in the commercial vehicle business during the past thirty-five years. They have become schooled in thoroughness. They are unhurried by time. Their efforts are studied. Their craftsmanship is deliberate.

Here at the plant where these men are helping Mr. Fisher to make Standard Motor Trucks, the expression "That is good enough" or "That will do" never falls from the lips of a single one of them. Their whole endeavor is fixed on the ideal that "What is worth doing at all, is worth doing well", and this ideal is built into each Standard Truck.

Sharing the rich, successful experience of Mr. Fisher, these men are finding their reward for life-long devotion to these high ideals in helping Mr. Fisher to set new standards in the world of motor truck manufacturing and to attain a new measure of achievement in motor trucks.

It is not unusual then that the great number of Standard owners who escape the truck experience casual to thousands should say that the Standard is "all the name implies."

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STANDARD MOTOR TRUCK COMPANY, Detroit, Michigan



### Final Adjustments Being Made in Standard Parts

A strong and permanent financing plan for The Standard Parts Co. was almost unanimously approved April 12, by a meeting of the company's creditors.

The plan which had already been approved by the Reorganization, Stockholders' and Creditors' Committees, contemplates a new company to take over the Standard Parts properties. This company will issue \$6,500,000 first mortgage 8 per cent. notes and 100,000 shares no par common stock. These securities will be accepted by the creditors to cancel in full the outstanding indebtedness amounting to about \$10,000,000. Stockholders in the old company will be allowed to buy the notes at par and also to buy the no par common stock at about \$35 per share, privilege of payment being extended over a period of nine months. The company's assets as a going concern are held at approximately \$25,000,000 as against the \$10,000,000 of indebtedness mentioned above.

It is planned to accomplish this reorganization as quickly as the necessary legal details incident to the receivership can be worked out. The present management will be continued, operating the following plants: The Perfection Spring Co., Cleveland, O.; the Pontiac Spring Co., Pontiac, Mich.; the Standard Welding Co., Cleveland, O.; the Bock Bearing Co., Toledo, O.; The Eaton Axle Co., Cleveland, O.; The Canton Forge Co., Canton, O.

The receivers' report shows that the company is no longer operating at a loss, business now amounting to in the neighborhood of \$1,000,000 a month.

At the meeting recently, gratification was expressed by all concerned at the helpful attitude displayed by the trade and others affected during the period of the company's difficulties, and as well as the belief that through this reorganization the properties affected will be enabled to maintain the position they had gained as important and dependable factors in the automotive industry.

### Chamber of Commerce Urges Improvement of Highways

Among the numerous resolutions passed at the ninth annual meeting of the Chamber of Commerce of America, held at Atlantic City, N. J., April 26 to 29, was a highway recommendation showing the attitude of the Chamber on highway appropriation. Said resolution is quoted in detail below:

"The importance of improved highways has already had recognition by the Chamber, and the highway development in the country has attracted wide attention. In order that funds now to be spent for highway construction may adequately serve the economic purposes which are becoming clearly recognized, the following fundamental principles should govern:

Bonds should be issued by states and territories, counties, or municipalities, and federal assistance furnished, only for

portions of highway construction which are reasonably enduring and permanent in character.

Federal appropriations should be made only for assistance to state highways which will become a part of an interstate system.

Federal assistance should be continued only to those states which adequately maintain highways for which there has been federal aid.

Most careful study should be made by the federal government in co-operation with state governments as to routes, the probable character of service over such routes, and the best form of construction to meet such service. These studies should include ultimate economies of location and design."

The meetings brought forth a number of timely discussions on opportune subjects of the day, the principal ones being: the condemnation of strikes, the urging of world readjustment, opposition to government ownership of railroads, the favoring of action by the United States defining its policy regarding the establishment and maintenance of world peace.

The automobile industry was well represented at the sessions.

### Hudson Places Big Orders

W. F. Hudson, president of the Hudson Motor Specialties Co., the Flexo Co., of America, and other Hudson companies with headquarters in Philadelphia, is now placing orders for parts to make up 30,000 Flexos, a patented extension for converting a Ford 1-ton truck into a 2-ton truck. Contracts are also being placed for material for the new Hudson Motor Truck Co. of America, which is to turn out a line of 2½-ton trucks.

### Truck Chassis Freight Rate to be Same as Passenger

The Interstate Commerce Commission recently ordered the Michigan Central Railroad to desist from making a distinction in the matter of passenger and freight automobile chassis, a decision in a test case.

It appeared that the railroad had been applying a lower rate for freight automobile chassis. The complainant argued that passenger chassis were identical to the freight chassis.

The commission decided that the rate charged was reasonable and fair, but ordered that no distinction should be made in the future between freight and passenger chassis.

### Three Firms to Merge

Three well known manufacturers, the Winther Motor Truck Co., the Marwin Truck Corp., and the Kenosha Wheel & Axle Co., all of Kenosha, Wis., are endeavoring to effect a consolidation which should prove beneficial to all concerned. Under the plan each factory will manufacture a truck of one capacity. The plan awaits ratification of the stockholders.

### North Carolina Taxed on Gasoline

Kinston, N. C., April 23.—The gasoline tax of one cent a gallon goes into effect throughout the state today, and according to the department of the Secretary of State, will yield \$500,000 a year for road building. The tax will be collected at the source of supply, the consumer finally paying the tax as he purchases the gasoline.

S-47-1-13-21-5m-APCo.		KALAMAZOO MOTORS CORPORATION	KALAMAZOO, MICH.
Name of Truck.....		Capacity.....	
Model.....		Year Built .....	Used for.....
General Condition			
Body.....	Motor.....	Wheels.....	
Tires.....	Transmission.....	Cab.....	
Frame.....	Clutch.....	Paint .....	
Axles.....	Steering Gear.....	Radiator.....	
General Remarks .....			
.....			
To.....			
Gentlemen:— .....			
You are hereby authorized to sell the above truck at a price to net me \$.....			
and apply this amount as initial part payment on Model..... Kalamazoo.			
Signed.....			
Date.....		Address.....	

### Simple Though Profitable Method Employed by the Dealers of the Kalamazoo Truck Corporation in Keeping Posted With Used Truck Prices

This system has proved itself valuable in that it has enabled the development of good prospects and has made readily available requested prices for a large number of used trucks throughout the various territories without involving expensive investment. This sheet is provided in pad form by the Kalamazoo Motor Corp. to all its dealers. Whenever a prospect, desiring to dispose of an old truck, is secured, he is requested to fill out the blank, which indicates the general condition and gives the price of the truck. This sheet is filled out in duplicate, one of which is retained by the prospect and the other is filed in the office.









## Gospel from Indiana

**A** GENTLEMAN from Indiana who happened to be an automotive Dealer, once told us that no matter how worthy products might be, "you've got to push 'em to move 'em." The gentleman is absolutely right.

But—

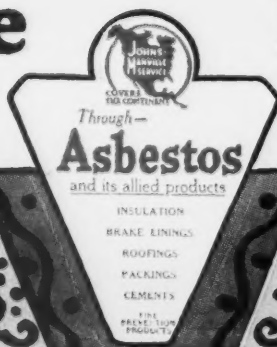
Some goods move rapidly with the slightest of pushing. Others require all kinds of shoving to move them. The former are obviously the most profitable for the Dealer to carry.

Johns-Manville automotive products move very rapidly with very little pushing because the customer knows they can be depended upon.

# JOHNS-MANVILLE

## Automotive

## Equipment





## Brake Lining that is built to specifications

**N**ON-BURN BRAKE LINING is built to specifications just as carefully as the finest motor car.

It must contain only the strongest asbestos fibres.

It must be spun and woven under the supervision of experts.

It must contain just enough wire to be as strong and tough as possible and still retain all its resiliency.

It must be impregnated by a special process that will increase its naturally high resistance to the action of oil, grease and gasoline.

And the reason Non-Burn is able to fulfill each of these specifications is because we manufacture it from start to finish. We follow carefully its every step from the very blast that heralds its birth at the mine, until it leaves our shipping rooms for your service.

### *Johns-Manville "Noark" Automobile Lighting Fuses*

— sure protection for the electrical equipment of your customers' cars.



### *Johns-Manville Automotive Seigelite Sheet Packing*

— tougher than paper, cheaper than rubber; very desirable for gaskets on water manifolds, crank or transmission cases, differential housings, carburetors, clutch and timing gear covers.



### *Johns-Manville Automotive Service Sheet Packing*

— can be used successfully wherever high temperatures are encountered; especially recommended for intake and exhaust manifold, and cylinder head



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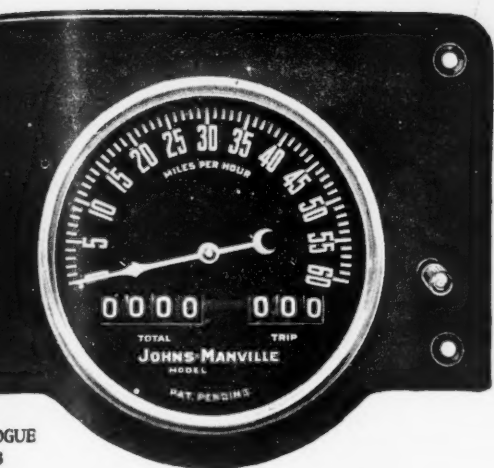
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## Some things sell themselves

LIKE watches or pocket-knives, automobile accessories have a fundamental appeal. That is why, when prominently displayed, they sell faster. For the eyes control the purse.

Display your Johns-Manville Speedometer for Ford cars. Remember there's blank space on the new Ford that looks mighty empty to the new owner.

Just let him see this speedometer and you will have nothing to do but punch the cash register.

### *Johns-Manville Automobile Tapes*

—strong in frictional and adhesive qualities, and will successfully meet the insulation requirements of automobile work.



### *Johns-Manville Hub Odometer*

—a 100,000 mile odometer with an accurate mechanism well protected by a heavy malleable iron hub cap; can be installed in a few minutes. Its daily readings are dependable and of great value.



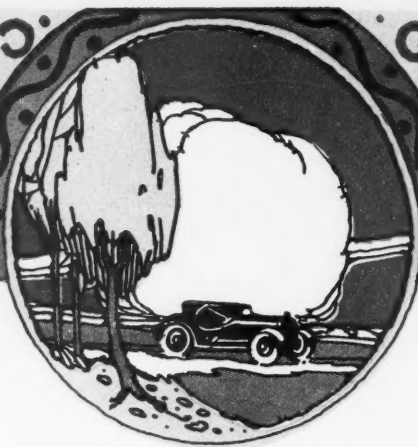
### *Johns-Manville Asbestos Friction Clutch Facings*

ONLY about a year old, these Clutch Facings have already proved their value in the automotive field. Formed under tremendous pressure, these facings possess a perfectly flat surface and a uniform density throughout.

Clutches equipped with Johns-Manville Clutch Facing engage easily and release without sticking.







# Pick your Distributor from this List

## Alabama

The I. J. Cooper Rubber Co., Birmingham  
Moore-Handley Hardware Co., Birmingham  
Johnson Tire & Auto Co., Montgomery

## Arkansas

Crow-Burlingame Co., Little Rock

## California

Chanslor & Lyon Co., Fresno  
Chanslor & Lyon Co., Los Angeles  
Featherstone, E. A., Los Angeles  
McCoy Motor Supply Co., Los Angeles  
Waterhouse & Lester Co., Los Angeles  
Weinstock-Nichols Co., Los Angeles  
Western Rubber & Supply Co., Los Angeles  
Chanslor & Lyon Co., Oakland  
Weinstock-Nichols Co., Oakland  
Kimball-Upson Co., Sacramento  
P. W. Gavin Company, Inc., San Diego  
Chanslor & Lyon Co., San Francisco  
Electric Appliance Company, San Francisco  
McCoy Motor Supply Co., San Francisco  
Waterhouse & Lester Co., San Francisco  
Weinstock-Nichols Co., San Francisco

## Colorado

Auto Equipment Co., Denver  
Foster Auto Supply Co., Denver  
Motor Accessories & Tire Co., Pueblo

## Connecticut

Motor Tire Service Co., Putnam  
Hessel & Hoppen Co., New Haven

## District of Columbia

National Electrical Supply Co.  
Rubel, Chas., & Co.

## Florida

Baughman Company, Norman G., Jacksonville  
Baughman Company, Norman G., Miami  
Baughman Company, Norman G., Tampa

## Georgia

Alexander-Seewald Co., Atlanta  
Cody Co., W. E., Columbus  
The I. J. Cooper Rubber Co., Atlanta

## Illinois

Automobile Supply Co., Chicago  
Chicago Automobile Supply House  
Chicago  
Electric Appliance Company, Chicago  
Motor Car Supply Co., Chicago  
Tenk Hardware Co., Quincy  
Universal Automotive Supply Co., Chicago  
Washington Auto Supply Co., Washington

## Indiana

Orr Iron Co., Evansville  
The I. J. Cooper Rubber Co., Indianapolis  
The Gibson Co., Indianapolis

## Iowa

Cedar Rapids Pump Co., Cedar Rapids  
Sleg Co., Davenport  
Herring Motor Co., Des Moines  
Repass Auto Co., Waterloo

## Idaho

Northwestern Auto Supply Co., Pocatello

## Kansas

Massey Hardware Company, Wichita  
Southwick Auto Supply Co., Topeka  
Watson-Weldon Co., Salina  
The Frank Colladay Hardware Co., Hutchinson

## Kentucky

Peaslee-Gaulbert Co., Louisville

## Louisiana

Electric Appliance Company, New Orleans  
Shuler Auto Supply Co., New Orleans

## Maine

Bigelow & Dowse Co., Bangor  
The Farrar-Brown Company, Inc., Portland

## Maryland

Auto Supply Co., Baltimore  
Coggins & Owens, Baltimore

## Massachusetts

Bigelow & Dowse Co., Boston  
Linscott Supply Co., Boston  
Westmore-Savage Co., Boston  
Motor Tire Service Co., Fitchburg  
Bigelow & Dowse Co., Springfield  
Duncan & Goodell Co., Worcester  
Motor Tire Service Co., Worcester

## Michigan

Bowman Gould Co., Detroit  
Roehm & Davison, Detroit  
Tisch Auto Supply Co., Grand Rapids

## Minnesota

Janney-Semple-Hill & Co., Minneapolis  
Kelley-Duluth Co., Duluth  
Minneapolis Iron Store Co., Minneapolis  
Reinhard Bros. Co., Minneapolis  
Williams Hardware Co., Minneapolis  
Nicols, Dean & Gregg, St. Paul

## Missouri

Joplin Supply Co., Carthage  
Joplin Supply Co., Joplin  
The Faeth Company, Kansas City  
Ayers Farmer Auto Supply Co., St. Joseph  
Beck & Corbitt Iron Co., St. Louis  
Fred Campbell Auto Supply Co., St. Louis  
Geller, Ward & Hasner, St. Louis  
Rogers & Baldwin Hardware Co., Springfield  
Joplin Supply Co., Webb City

## Montana

Northwestern Auto Supply Co., Billings

## Nebraska

Nebraska Buick Auto Co., Lincoln  
Western Auto Supply Co., Omaha

## Nevada

Nevada Auto Supply Co., Reno

## New Hampshire

Thompson & Hoague Co., Concord

## New Jersey

Economy Auto Supply Co., Newark

## New York

Albany Hardware & Iron Co., Albany  
Martin Evans Co., Brooklyn  
Strauss Co., Joseph, Buffalo  
Barker, Rose & Clinton Co., Elmira  
Picard & Co., Inc., A. J., New York  
Roberts Electric Supply Co., H. C., Syracuse

## North Carolina

Carolinas Auto Supply House, Charlotte

## North Dakota

Grant, J. D., Fargo

## Ohio

The Penn. Rubber & Supply Co., Akron  
C. & D. Auto Supply Co., Cincinnati  
The I. J. Cooper Rubber Co., Cincinnati  
The Penn. Rubber & Supply Co., Cincinnati  
The I. J. Cooper Rubber Co., Cleveland  
The Penn. Rubber & Supply Co., Cleveland  
The I. J. Cooper Rubber Co., Columbus  
The Penn. Rubber & Supply Co., Columbus  
Justus & Parker Co., Columbus  
The I. J. Cooper Rubber Co., Dayton  
The I. J. Cooper Rubber Co., Toledo  
The Penn. Rubber & Supply Co., Toledo  
The Penn. Rubber & Supply Co., Youngstown

## Oklahoma

Joplin Supply Co., Commerce  
Severin Tire & Supply Co., Oklahoma City  
Joplin Supply Co., Tar River  
Tulsa Motor Supply Co., Tulsa

## Oregon

Wiggins Company, Inc., Portland  
Chanslor & Lyon Co., Portland  
Waterhouse & Lester Co., Portland

## Pennsylvania

General Motor Supply Co., Altoona  
The Penn. Rubber & Supply Co., Erie  
Front Market Motor Supply Co., Harrisburg  
Johnstown Auto Co., Johnstown  
The Penn. Rubber & Supply Co., Oil City  
Berrodin Rubber Co., Philadelphia  
Gaul, Derr & Shearer Co., Philadelphia  
Motor Accessories Co., Allentown  
Roberts Electric Supply Co., H. C., Philadelphia  
Dyke Motor Supply Co., Pittsburgh  
Lansing Bros., Inc., Scranton  
General Auto Supply Co., Lancaster  
General Auto Supply Co., Lebanon  
General Auto Supply Co., York

## Rhode Island

Belcher & Loomis Hardware Co., Providence

## South Carolina

Frankie Co., Inc., C. D., Charleston

## South Dakota

L. & L. Motor Supply Co., Sioux Falls

## Tennessee

Southern Auto Supply Co., Chattanooga  
The I. J. Cooper Rubber Co., Knoxville  
The I. J. Cooper Rubber Co., Memphis  
Ozburn-Abston & Co., Memphis  
Auto Supply Co., Nashville  
The I. J. Cooper Rubber Co., Nashville

## Texas

Electric Appliance Company, Dallas  
Tri-State Accessories Corp., El Paso  
Meyer Co., Jos. F., Houston  
The Southern Equipment Co., Houston  
The Southern Equipment Co., San Antonio  
McCauley-Ward Motor Supply Co., Waco

## Utah

Inter-Mountain Electric Co., Salt Lake City  
Motor Mercantile Co., Salt Lake City

## Virginia

Owens-Merritt, Danville  
Piedmont Hardware Co., Danville  
Crump Co., Benj. T., Richmond  
Meadows-Price Co., Roanoke

## Washington

Chanslor & Lyon Co., Seattle  
Reynolds & Reynolds, Seattle  
Chanslor & Lyon Co., Spokane  
Holley-Mason Hardware Co., Spokane  
Chanslor & Lyon Co., Tacoma  
Reynolds & Reynolds, Tacoma

## West Virginia

Williams Hardware Co., Clarksburg

## Wisconsin

Andrae & Sons Co., Julius, Milwaukee  
Shadbolt & Boyd Iron Co., Milwaukee  
Tisch Auto Supply Co., Milwaukee  
Western Motor Supply Co., Milwaukee

## CANADA

### Alberta

Motor Car Supply Co., Calgary  
Motor Car Supply Co., Edmonton  
Marshall Wells Co., Limited, Edmonton  
The Chapin Co., Ltd., Calgary  
Wood, Vallance & Adams, Ltd., Calgary

### British Columbia

Wood, Vallance & Leggat, Ltd., Vancouver

### Manitoba

Wood, Vallance, Ltd., Winnipeg

### Ontario

Whites, Limited, Collingwood  
Wood, Alexander & James, Hamilton  
Just Motors Limited, Ottawa  
Wood, Alexander & James, Toronto  
Bowman Anthony Co., Windsor

### Saskatchewan

Wood, Vallance, Limited, Regina

### Quebec

Omer De Serres, Montreal

**JOHNS-MANVILLE, Inc.**  
Madison Avenue, at 41st Street, New York City  
Branches in 63 Large Cities  
For Canada: Canadian Johns-Manville Co., Ltd., Toronto







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## Personal Items

**W. A. Armstrong**, 965 Woodward Ave., Detroit, has been named as Michigan representative for the Breeze Metal Hose and Manufacturing Co., Newark, N. J. The deal involves the handling of flexible tubing, carburetor choke controls, etc.

**James T. Aubrey** has been announced as advertising manager of the Packard Motor Car Co., to succeed W. H. Holmes, resigned. Mr. Aubrey was formerly western manager for the Cosmopolitan magazine.

**Edwin S. Beggs**, Long Beach, Cal., has assumed sales management of the Planet Manufacturing Corp., of Detroit, manufacturer of a carburetor attachment.

**P. B. Brown**, general sales manager of the Thomast Motor Co., after an illness of two months has returned from French Lick to resign his position and will take a month to recuperate. He expects to take a trip to England.

**C. M. Bunnell**, formerly with the Edison Lamp Works of General Electric Co., has accepted the position of director of branches with the Splittorf Electrical Co., with headquarters at the general offices, 98 Warren St., Newark, N. J.

**Robert H. Campbell**, second vice-president and purchasing agent of the Comet Automobile Co., Decatur, Ill., has resigned to become president of the National Axle Co., Indianapolis, Ind.

**Clyde Chaddick** has been elected president of the Corpus Christi Automobile Trade Association, of Corpus Christi, Tex. J. C. Blackall is vice-president, and Charles Roster is secretary-treasurer.

**Frank Clark**, formerly with the Stanwood Equipment Co., is to represent the Federal Rubber Co., Cudahy, Wis., as special factory representative to automobile and truck manufacturers.

**Louis E. Clark**, who, until recently, was connected with the manufacturing department of the Hoyt Metal Co., Boatmen's Bank Bldg., St. Louis, has been appointed sales manager of the babbit-lined bronze bushings and die castings departments.

**W. G. Clay** was appointed assistant sales manager of the truck and traffic division of the Traylor Engineering and Mfg. Co., Cornwells, Bucks County, Pa. Likewise C. H. Patten and J. L. Fulton were appointed chief engineer and production engineer, respectively.

**S. N. Clemons**, for seven years assistant purchasing agent for the Northway Motor & Manufacturing Co., recently resigned to become identified with the Mid-Western Sales Corp. as general sales manager.

**Otis R. Cook** has been elected vice-president and director of the Howe Rubber Co., New Brunswick, N. J. The company will maintain offices in the Cook Bldg., 4614 Prospect Ave., Cleveland. H. H. Globe will be general sales manager.

**John W. Davis**, until recently ambassador to Great Britain, has been elected a director and General Counsel of the United States Rubber Co.

**Chas. E. Davy**, formerly sales manager for the Universal Products Co., has joined with the Denby Motor Truck Co., of Detroit, as district manager.

**L. E. DeGroat**, formerly of the sales staff of the Timken Detroit Axle Co., is now with the Acme Motor Truck Co., of Cadillac, Mich., in charge of dealer promotion work.

**R. L. DeVoe** has been announced as general sales manager of the Dawson Manufacturing Co., Chicago, Ill., manufacturer of grease cups. The firm is now in its new factory at 2012 Larrabee St.

**W. S. Doty**, formerly of the Cleveland Tractor Co., has joined the Globe Motors Co., of Cleveland, O. He has acquired a substantial financial interest and will act as treasurer. The company plans to produce a speed truck in the near future.

**R. G. Enell**, formerly of the Federal Motor Truck Co., is now representing the Standard Motor Truck Co., of Detroit, in southeastern territory. C. R. Evans has also been chosen to represent this company in Oklahoma.

**E. E. Eby** joined the Remy Electric Co. of America at Anderson, Ind., April 1, in the capacity of purchasing agent. He was formerly American director of Delco-Remy Ltd. and Hyatt Ltd., with offices at New York.

**Charles C. Hanch**, vice-president of passenger car division of the N. A. C. C., has become associated with the Homer McKee Advertising Co., of Indianapolis, as general business counsel.

**Joseph L. Hartig**, advertising manager of the motor bearing division of the Hyatt Roller Bearing Co., has joined the staff of the Campbell-Eward Co. to assist in sales promotion work.

**R. C. Hawley** has rejoined the sales staff of the Remy Electric Co. and will work under the supervision of G. B. Stone, general sales manager. He was formerly with the Mitchell Motor Car Co. and later with the Remy organization.

**B. F. Jones** has resigned as president of the Republic Rubber Co., Youngstown, O. He will return to his home in Worcester.

**J. Harold Kraus, Jr.**, formerly of San Francisco, Cal., has joined the sales department of the Bantam Ball Bearing Co., Bantam, Conn.

**Joseph F. Maley** has been appointed factory representative for the New England territory by the Flexo Company of America, Philadelphia, Pa.

**S. A. Miles**, show manager of the N. A. C. C., is investigating the automobile situation for the export department of the N. A. C. C. in Europe. He is accompanied by Mrs. Miles, William G. Stirm and Charles E. Elias.

**E. A. Murphy** has been appointed assistant general sales manager of the Detroit Trailer Co., with headquarters at Buffalo. He has resigned as purchasing agent of the Denby Motor Truck Co.

**Thomas W. Peters** will represent the South for the Black & Decker Mfg. Co. He will make his headquarters at Atlanta, Ga., where a regular branch office has been established.

**Russell B. Reid** has been made manager of sales for the Sharon Pressed Steel Co., of Sharon, Pa., manufacturer of motor car frames, industrial trucks, pressed steel, etc.

**John H. Rosen** has resigned his position as general distribution manager of the Packard Motor Car Co., 319 N. Broad St., Philadelphia. His future plans are unknown.

**E. D. Shearman**, one of the original organizers of the Salisbury Wheel & Axle Co., of Jamestown, has been elected a director and secretary of the Collier Motor Truck Co., of Bellevue, O.

**Paul P. Smathers**, formerly sales manager of the Whitmire Motor Sales Co., Asheville, N. C., is now in charge of sales and advertising of the Ursus Motor Co., 6601 W. Grand Ave., Chicago.

**J. W. Smith**, of Danville, Ill., has invented a piston for gasoline motors made of aluminum alloy, which is to be manufactured soon in that city. The piston has several unique features in its pin boss arrangement.

**Charles H. Sprague**, formerly assistant agricultural engineer with the Cleveland Tractor Co., has resigned that he may go to China as lubricating engineer for the Standard Oil Co. of New York.

**H. Y. Stebbins**, formerly of the American Polish Relief Expedition directing motor transport work, is now representing the interests of the Standard Motor Truck Co. in California and southwestern territory. His headquarters will be San Francisco and Los Angeles.

**H. A. Steere**, of Detroit, Mich., has joined the Lyon Metallic Mfg. Co., of Aurora, Ill., in the capacity of service equipment engineer. He has been connected with the automotive industry since its inception.

**P. A. Tanner**, who has for the past five years been connected with the Splittorf Electrical Co., of Newark, N. J., and its subsidiaries in various capacities, has resigned as advertising manager and service manager of the firm.

**J. E. Tracy**, for the past four years general sales manager of the Sterling Motor Truck Co., Milwaukee, Wis., has been made vice-president and director of sales of the Hicks-Parrett Tractor Co., of Chicago Heights, Ill.

**M. D. Wallace** has been announced as manager of the Baltimore branch of the Bearings Service Co., of Detroit. The Baltimore branch is located at 1041 Cathedral St.

**Robert S. Wilson**, who was manager of the truck tire department for Goodyear, has been made manager of the western division, which includes ten States, with headquarters in Chicago.

**Frank B. Wood**, formerly manager of the Detroit branch of the Van Sicklen Speedometer Corp., has been appointed manager of the Phila. branch of the Dorris Motor Co.

## Removals and Trade Changes

**The Black and Decker Manufacturing Co.**, Towson Heights, Baltimore, Md., announces that its New York branch office, formerly at 141 Broadway, is now located in the Printing Crafts Bldg., 8th Ave. and 33d St.

**The Central Rubber and Supply Co.**, Main St., Ft. Wayne, Ind., will discontinue its store. The organization is to be moved to Indianapolis and consolidated with the main store.

**The Iron City Products Co.**, 7501 Thomas Blvd., Pittsburgh, Pa., has changed its name to the Rees Manufacturing Co., to conform with that of its product, the Rees jack.

**The Laminated Shim Co.** has moved to its new plant and offices at 14th St. and Governor Place, Long Island City, N. Y. The new plant permits a manufacturing space of 25,000 sq. ft.

**The Motor Wheel Corp.**, of Lansing, Mich., has opened an eastern office at 33 West 42d St., New York City. This office and territory will be in charge of Thomas J. Wetzel.

**The New Tread Tire Co.**, Columbiana, O., has leased the plant of the East Palestine Rubber Co. at East Palestine, O., to manufacture its tires.

**The H. B. Shontz Co.**, distributor of U. S. L. batteries in the Metropolitan district, announces that it has moved to its new quarters at 161 West 64th St., New York City, where it will conduct an up-to-date battery and electrical service station.

**The Trackless Transportation Corp.** announces the opening of general offices at 300 Madison Ave., New York City.

**The United Automotive Body Co.** has moved its general offices from Springboro, Pa., to Cleveland, O. The firm produces truck and other motor vehicle bodies.

**The Wroten-Hundley Motor Co.**, San Antonio, Tex., Dodge dealer, will move to its spacious sales rooms on Avenue C at 8th St. The new quarters will occupy a floor space of 25,000 sq. ft.



## New Incorporations

**The Erie County Auto Sales Co.** has been incorporated at Columbus, O., with a capital stock of \$30,000.

**Counselman Auto Co., Inc.**, has been incorporated by W. A. Counselman, Mrs. H. S. Allard and R. B. Allard at Dallas, Tex., with a capital stock of \$4,000.

**The Service Station Supply, Inc.**, was chartered recently in Dover, Del., to manufacture storage battery parts, etc. Capitalization, \$100,000.

**The Ruggles Motor Truck Co.** has been incorporated in Wilmington, Del., to manufacture and sell automobiles, etc. Capitalization, \$6,000,000.

**The Prather Wheel Mfg. Co.**, of Detroit, has been chartered by Frank M. Prather, inventor of a resilient truck wheel, and Frank Eack. The capitalization is \$1,000,000.

**The Automatic Gas Saver Corp.**, of Harrisburg, Va., has been chartered to manufacture and deal in gas saving devices. The maximum capital is to be \$50,000 and the minimum \$10,000.

**Champion Tire Patch Manufacturing Co.** has been incorporated at Lincolnton, N. C., with \$50,000 authorized capital and \$5,000 paid in by K. B. Nixon and others.

**The Atlantic Rubber Ace Co.**, 390 George St., New Brunswick, N. J., with a capital stock of \$100,000, has been organized to manufacture automobile tires, casings, tubes, etc.

**Fred H. Plexico, Inc.**, Greenville, S. C., has been chartered to operate an automobile business, with capital stock of \$10,000. Fred H. Plexico is president, secretary and treasurer.

**The Flexo Company of America**, of Philadelphia, Pa., has been formed to handle the Flexo, an attachment for the Ford Worm Drive Truck. The new firm is a subsidiary of the Hudson Motor Specialties Co.

**The Johnson-Walton Motor Sales Corp.** has been incorporated in New York County, N. Y., by M. E. Graef, 68 Winfield Ave., Jersey City, N. J., to sell automobile motors, etc., at a capitalization of \$100,000.

**The Penn Motors Corp.**, 1714 North Broad St., Philadelphia, Pa., has been chartered to manufacture trucks. Hilton W. Sofield, former vice-president and general manager of the Keystone Truck Co., of Philadelphia, will head the corporation.

**The Automobile Dealers' Used Car Clearing House, Inc.**, has been formed with temporary headquarters at 168 West Fifth St., St. Paul, Minn. The object is to centralize the used-car stock of the members of the corporation.

## Literature

**The Continental Car Co. of America**, Louisville, Ky., has issued a catalog of its commercial bodies for Ford 1-ton and Model T chassis. These catalogs are for free distribution to Ford dealers anywhere and will be sent on request.

**Holmes Federal Taxes and 1921 Supplement**, in two volumes, presents a complete comprehensive and exhaustive treatment on the Federal income and profits taxes, capital stock tax, stamp taxes and taxes on the products of child labor. Published by the Bobbs-Merrill Co., Indianapolis, Ind., and sells complete for \$10.

**Lubrication**, the monthly publication of the Texas Company, has devoted its March issue to the lubrication of motor vehicles. The article is very comprehensive and contains an abundance of useful helps for the owner and garageman.

**The Joseph Dixon Crucible Co.**, maker of automobile lubricants, has just published an extremely interesting booklet on the subject of proper gear lubrication. Various products of the company are described and their application shown graphically by a chassis chart. Free on request from the Joseph Dixon Crucible Co., Jersey City, N. J.

**The Garco Data Book** has been issued by the General Asbestos and Rubber Co., Charleston, S. C., for the purpose of instructing the repairman, dealer or jobber in efficient brake and clutch lining service.

**Light Touches**, a new monthly house organ, has made its appearance, having been launched by the Westinghouse Lamp Co. It is technical to only a slight degree—one article an issue. It will deal with the activities of its agents and its lighting, service and engineering activities.

**Practical Motor Body Building**, by C. W. Terry. It contains several very good chapters on omnibus and char-a-banc bodies. The volume containing 348 pages can be obtained from E. & F. N. Spon, Ltd., 57 Haymarket, London, S. W. 1, England, for 15s. with postage 1s. 6d.

**Questions and Answers Relating to Modern Automobile Construction, Driving and Repair** is the latest work of Victor Page, well-known engineer. It is a practical treatise consisting of a series of 39 lessons, covering, with over 2000 questions and their answers, the automobile, its construction, operation and repair. Sold for \$2.50 by Norman W. Henley Publishing Co., 2 West 45th St., New York City.

## New Agencies

**The Texas Motor Truck Equipment Co.**, 500 N. Akard, Dallas, Tex., has been formed to distribute motor truck equipment.

**The Oshkosh Truck Sales Co.**, 1509 Michigan Ave., Chicago, is a newcomer to "Auto Row." The firm will be managed by Edward J. Post.

**The Bearings and Rim Supply Co.**, 1423 First Ave., Spokane, Wash., has been organized by H. C. Alderson and Wolf H. Duncomb, who are both well known in automobile circles.

**The Decatur Truck Co.**, distributing the Republic in Macon County, Ill., has been purchased by L. E. Fisher, of Decatur. A number of enlargements to the plant are planned.

**The Alvord Reamer & Tool Co.** has opened a branch office in Chicago at 546 W. Washington Blvd. and will carry a complete stock of all items manufactured. T. J. Davis, C. E. Block and C. B. Cole will be identified with the branch.

**The Atterbury Motor Truck Co.**, of Philadelphia, has opened a large new sales and service building at 3322 N. Broad St., where it will handle Atterbury trucks exclusively.

**Lane Bros. Co.**, Poughkeepsie, N. Y., has appointed Hughson & Merton, Inc., of San Francisco and Los Angeles, as exclusive sales representatives for the Pacific Coast.

## Obituary

**Alton J. March**, president of the March Motors Co., Milwaukee, Wis., well known distributor of Duplex trucks and Mitchell and Grant passenger cars in Wisconsin and upper Michigan, died April 20 after a six weeks' illness. For two terms he served as president of the Milwaukee Automotive Dealers' Association and has always worked for betterment of the automobile industry.

## Factory News and Capital Increases

**The Maccar Truck Co.**, of Scranton, Pa., is planning large building additions to its factory and has increased its capital by \$1,000,000.

**The Auto Body Co.**, of Lansing, Mich., has through its stockholders authorized an increase in capital stock from \$2,200,000 to \$2,800,000 by adding \$600,000 to the authorized common stock.

**The Timken Roller Bearing Co.**, Columbus, O., branch, has resumed operations after a shutdown since last October. About 250 men were placed at work with a view to gradually increasing this number to 2,500.

**The Vacuum Oil Co.**, 61 Broadway, New York City, announces a reduction of from \$5 to \$10 per barrel on its Gargoyle Mobiloils. The reduction was effective as of April 20.

**The Jas. Clark, Jr., Electric Co.**, Louisville, Ky., reports that out of 23 bids submitted to the Air Service Div., War Dept., it was awarded the order for 145 "Willey" portable electric drills.

**The Lease Motors Co., Inc.**, with factory at Long Island City and offices in New York, will launch a new low-priced 1½-ton truck in the American market. The company has been building trucks for export.

**The McKay Carriage Co.**, Grove City, Pa., is erecting a new addition to its plant which will approximately increase its capacity 50 per cent. The factory is running at full capacity at the present time and is specializing on school and bus bodies.

**The Highland Body Mfg. Co.**, Cincinnati, O., has opened up a second assembling plant at Cottage Grove and Calumet Aves., Chicago, to handle its standard bodies and cabs.

**The Multiple Storage Battery Co.**, 104 W. 52d St., New York City, announces the reorganization of its business. H. G. Clopper is president and treasurer.

**The Sharon Pressed Steel Co.**, of Sharon, Pa., has been taken over for refinancing and reorganization by Harry W. Torney, Albert W. Morris, Arthur E. Swan and their associates.

**The United Automotive Body Co.**, Euclid Ave. and 49th St., Cleveland, O., has made a reduction in prices ranging from 10 to 25 per cent on all Ford bodies. The company has also opened two more branch assembly plants in Detroit and Pontiac, Mich.

**The Goodyear Tire & Rubber Co.**, Akron, O., has just developed a new type of solid rubber motor truck tire, which is an adaptation of the diamond block passenger car design. Recent tests on this tire have proven very satisfactory.

**The Fosdick Machine Tool Co.**, of Cincinnati, O., maker of high-grade heavy duty radial drills and upright drills, has taken over all patents, drawings, patterns, jigs and fixtures covering the line of Pierle quick change high-speed ball-bearing sensitive drill presses from the R. K. LeBlond Machine Tool Co.

**The American Truck and Trailer Corp.**, of Kankakee, Ill., has been reorganized with J. M. Mitchell, president; George Kramer, vice-president; Grover Tice, secretary and treasurer, and H. O. McClain, assistant secretary. Mr. Mitchell was formerly of the Cook Motors Corp.

**The Denman-Myers Cord Tire Co.**, of Cleveland, O., has recently closed a contract with the Transit Sales & Service Co., Haynes wire wheel distributors for Pennsylvania, New Jersey, Delaware, Maryland and the District of Columbia. It is expected that the Denman-Myers company will receive not less than \$200,000 worth of business from this distributor.

# THE COMMERCIAL CAR JOURNAL

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## TABLE OF CONTENTS

	PAGE
Advertisers' Index .....	226
Buyers' Index of Reading and Advertising Pages ..	222
Commercial Car Specifications.....	55
Editorials .....	41
Equipment and Appliances.....	46
Metal and Rubber Markets.....	71
New Commercial Cars.....	72
News of the Trade, Including Personals, New Agen- cies, Factory Items, Etc. ....	42
Pneumatic Tire Prices.....	68
Replacement Table .....	49

**SPECIAL ARTICLES**

What Service Means to the Dealer .....	13
The Potential Market for Truck Replacement Parts in 1921 .....	15
Factory Service Managers Anxious to Co-operate ..	17
Simple and Efficient Accounting System .....	18
What Does the Manufacturer Owe the Dealer?.....	22
Does Your Service Station Need the Pulmotor? ....	24
Harvest for Independent Service Shop .....	25
"Say It With Printer's Ink" .....	27
The Honor System in Service .....	29
The Dealer Can Increase His Sales by Adopting the Vocational Selling Plan.....	31
Are You Looking for Business-Building Helps? ....	34
"Get the Truck on the Road" .....	36
Are You Supporting Your Service Association? ....	38
S. A. E. Engineers See Need for Intensive Research and Education .....	44
Facts About the Best, Cheapest and Quickest Method of Rendering Truck Spring Service.....	45
Service is a New Industry.....	67
Does the Average Truck Owner Know Why He is Not Getting Tire Mileage?.....	70
Side Lights on What the Associations Are Doing and Planning .....	90
Here Are a Few Things for the Manufacturer to Consider .....	94
Motor Paper is Now Good in Kansas City.....	95

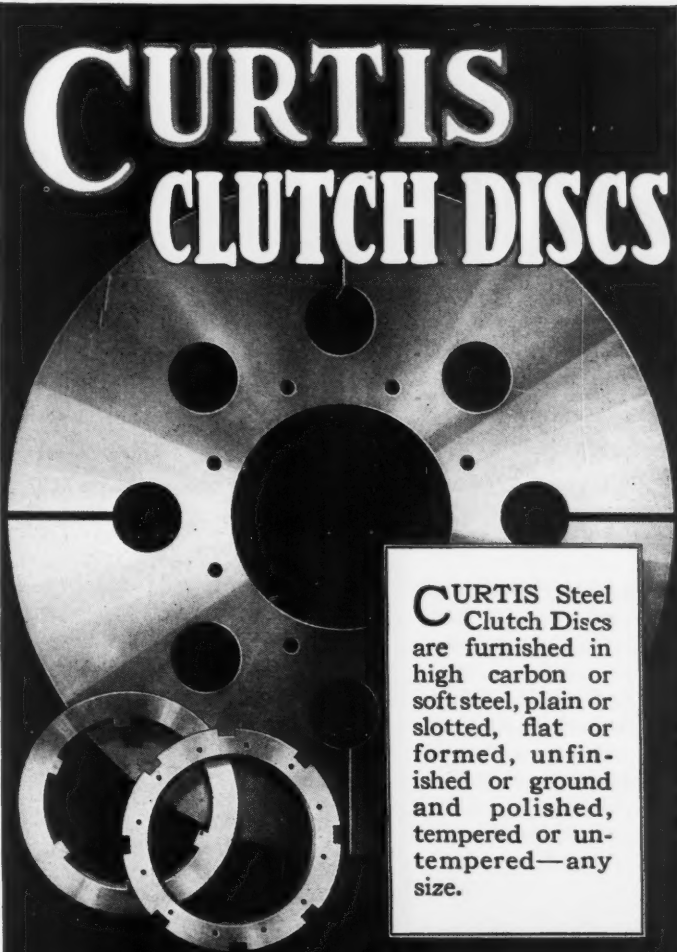
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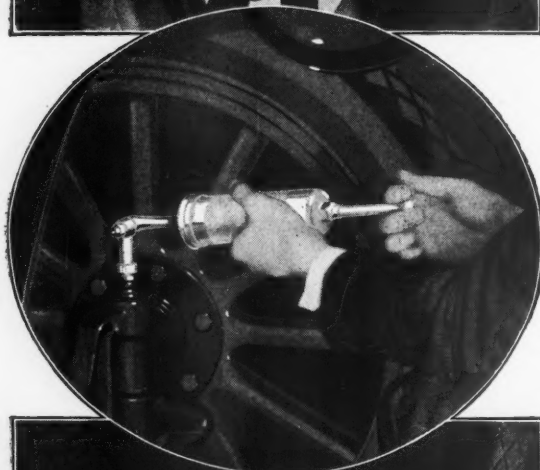
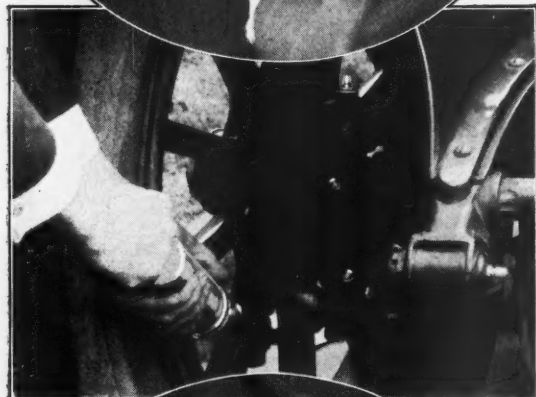
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## As Long as Cars are Run They Must be Lubricated

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(28)



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